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the OIL AND GAS JOURNAL

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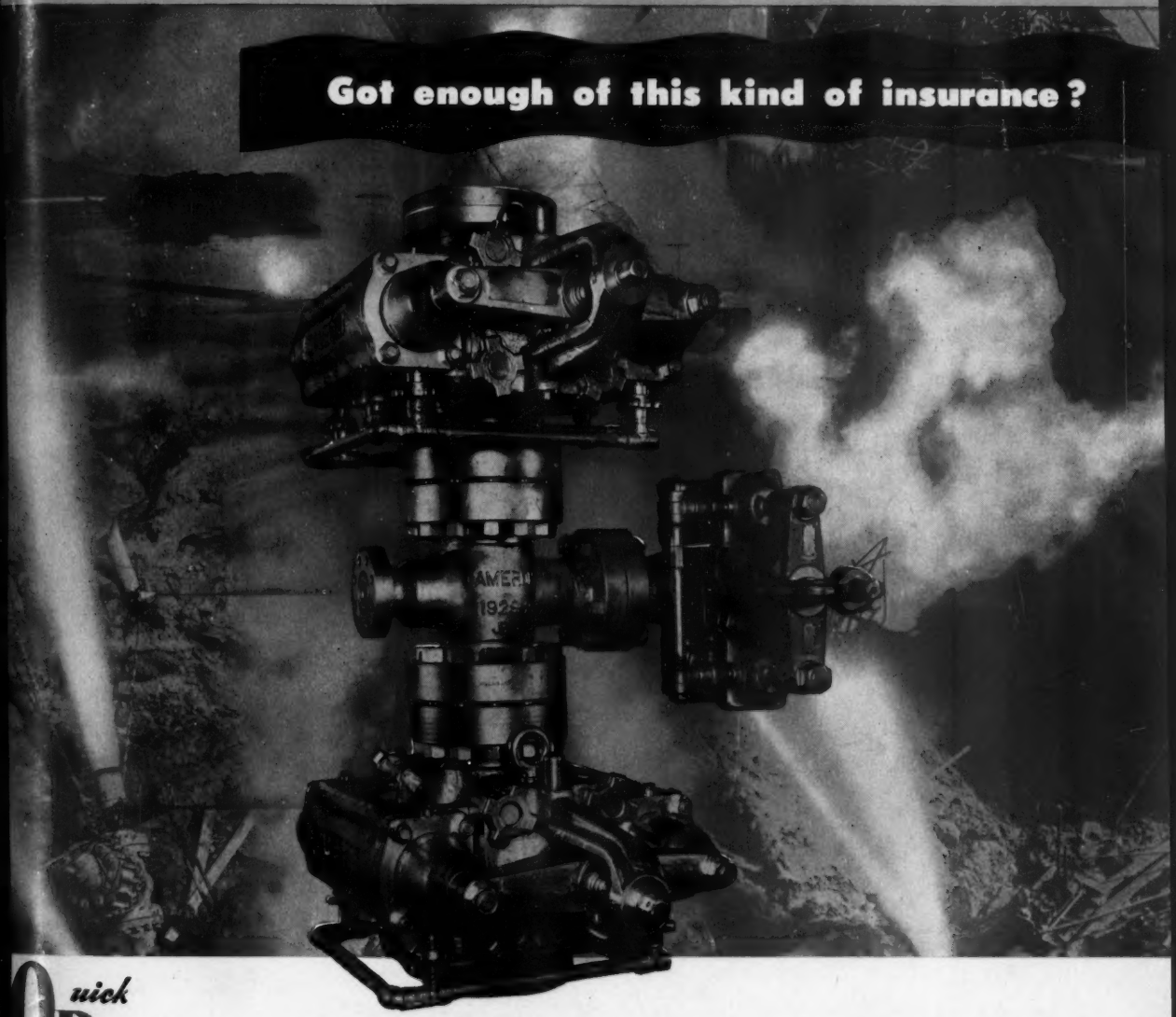

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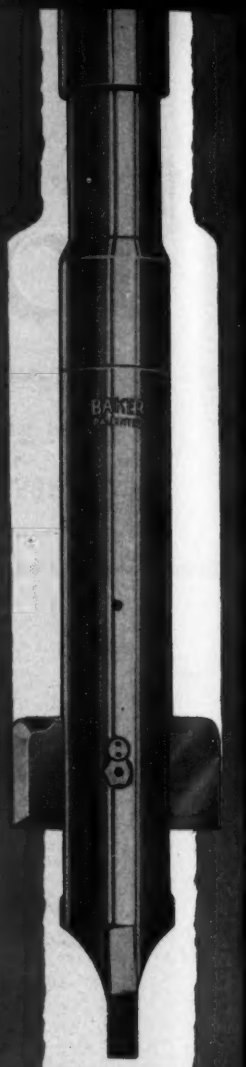

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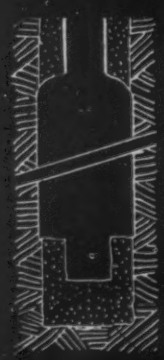


Fig. 1

Fig. 2

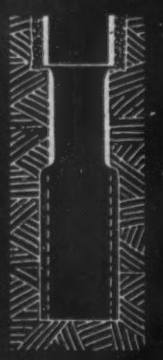


Fig. 3

Fig. 4

Fig. 5

Fig. 6

THE OIL AND GAS JOURNAL

Filling the Gap

HUMBLE'S President Wiess last week told company employes that the oil business should not be expected indefinitely to expand its production of oil fuels to offset the failures of the coal industry. The threat is that in supplying the rapidly increasing fuel demands, shortages will develop for which operators will be blamed and which conceivably could force the production of costly synthetic substitutes, with the oil industry and its customers paying the bills.

A few figures will explain this shift from coal to oil products which many in the industry have ignored, either because they did not consider it important or felt that nothing could be done about it. The first 9 months of this year domestic oil consumption was 10.4 per cent greater than last year and 30.5 per cent greater than in the first three quarters of 1941. When this total increase is broken down, the gain in motor-fuel consumption this year over last was 8.1 per cent, while distillate consumption expanded 21.5 per cent. The gains over 1941 are 17.8 per cent in the case of gasoline and 64.8 per cent for distillates. When fuel oil and kerosine are added to the distillate totals the output expansion this year of intermediate and residual products is more than 50 per cent greater than the motor-fuel increase.

What this in effect means is that the bulk of the expansion in petroleum requirements since the close of the war has been in fuel markets and not in gasoline and other products for which there is no substitute comparable in price and quality.

The end in this trend is not in sight. A speaker at the Interstate Oil Compact Commission meeting last week said that for the first 8 months of this year sales of oil burners were 500,000 ahead of last year. An average home requires around 2,500 gal. of furnace oil for the heating season. The important industrial fact is that most of this distillate can be converted to a yield of 40 or more per cent of motor fuel at a processing cost of less than 1 cent per gallon. Thus the home owner with oil heat is burning more gasoline in his furnace than he is consuming in his car over an entire year.

Some may say, "Fine, the more outlets we have the higher the markets for crude oil and products." This is short-sighted. So long as we have high wages and full employment most buyers are not concerned with price. But the long-range question has to do with the position of the oil business should it find itself later with limited indigenous petroleum supplies, saddled with many millions of customers demanding furnace oil at lower prices.

There are other angles to this development—none in line with a prewar situation in which emphasis in refining was placed on the maximum yields of the essential products of petroleum. The danger to the oil business is that in trying to fill this fuel gap it falls into the hole.

Slow-Spreading Crude Advance Becomes General; Products Up

THE price of crude oil advanced uniformly 50 cents per barrel throughout all producing regions east of California this week as large and small purchasers increased their postings to meet the increase initiated by Sun Oil Co. November 23.

It was not until the evening of December 8 that all large purchasers announced the advance. For a week Sun's price had remained unmet by major buyers in the Gulf Coast and Mid-Continent areas, but late December 5 Magnolia Petroleum Co. raised all its postings 50 cents. Among the last to fall in line were purchasing subsidiaries of Standard of New Jersey, Standard of Indiana, and Shell groups, whose top officials earlier had publicly deplored Sun's action on the ground that price increases are not justified at this time. All changes after December 5 were effective December 6.

This is the largest single advance in crude prices in a generation, and brings the price to its highest point since 1921. It was also the slowest in spreading, as usually a price change by a major buyer is met by others within a matter of hours. During the week of hesitation several companies, including major buyers, lost substantial crude connections and were served ultimatums that they would lose more, while in East Texas talk of a "seller's strike" threatened to close in production unless the price were met.

There was doubt, however, that the increase would result in the objective announced by Sun—ending the widespread practice of paying premiums and bonuses above the posted price. Premier Oil Refining Co. in East Texas and Baird Refining Co. in West Central Texas announced that they would continue their practice of paying 10 cents per barrel above crude prices posted by others. Also there were reports that unpublicized premiums, some as much as 15 cents per barrel, have not been abandoned, and such "round-about methods" of retaining crude connections as making loans to producers, reducing gathering charges, and obtaining pipe and other supplies for them, continue in effect, according to field reports.

In California the crude price picture was still confused by midweek, as no other large purchaser had moved to meet the 40-cent per barrel increase announced by Union Oil Co. December 1.

Elsewhere the 50-cent increase was universal except for a few relatively minor changes in the gravity scales in some areas, particularly the Rocky Mountain black-oil postings of Carter Oil Co. and Ohio Oil Co. There the price of 29° gravity was raised exactly 50 cents but the differential above and below that grade was made 2 cents per barrel per degree instead of the former differential of 2½ cents. This gave 15° gravity a price of $1.97 per barrel and 40° and above a price of $2.47 per barrel.

Pennsylvania grade crude is now priced at $5.00 per barrel, in the Bradford, Allegany, and Middle districts, a record except for the $6.10 price which prevailed briefly in 1921. Other grades of crude also advanced 50 cents per barrel throughout the Appalachian area.

Typical of the new postings are: Illinois-Indiana Basin, $2.77; Kentucky River Fields, $2.83; Ragland, Ky., $2.43; Oklahoma, Kansas, and most Texas fields, 36° gravity, $2.57, 40° and above, $2.65; East Texas, $2.65 flat price; West Texas and Lea County, N. M., 36° gravity, $2.44 and $2.50 depending on the field.

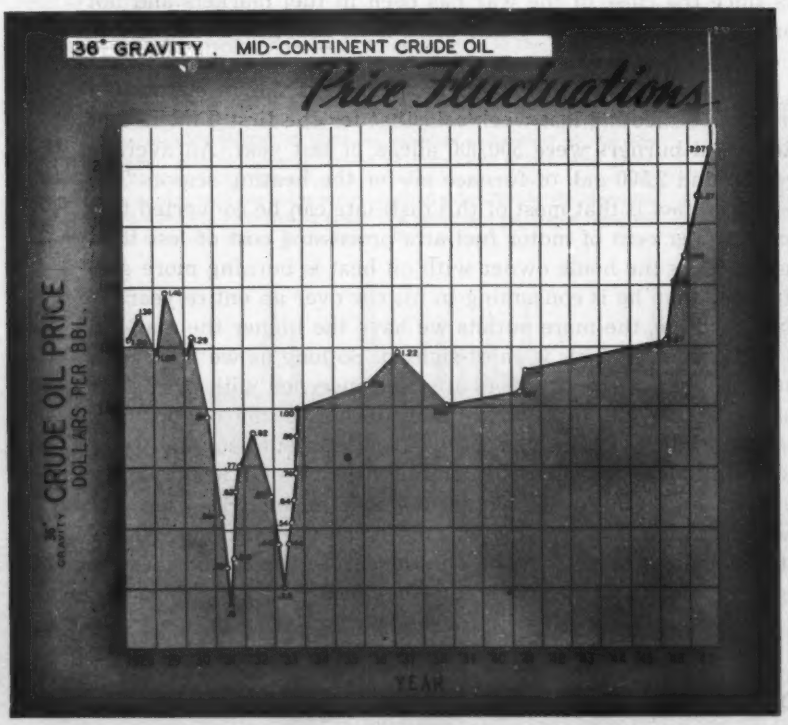
Products Edging Up

Products prices generally did not respond at once to the higher crude listings, but were beginning to edge up and it was the general opinion in the industry that refinery tank car and retail prices for major petroleum products would soon reflect the full 50-cent increase in crude cost.

Typical of the early adjustments was that of Standard Oil Co. of Ohio, which raised its tank car prices 1½ cents per gallon on gasoline, kerosine and distillate fuels and 1¾ cents per gallon on residual fuel oil. Refiners selling on the spot market were generally withholding quotations, awaiting the moves of the market leaders, though some made temporary advances of 1¾ cents per gallon on gasoline and distillate.

When Sun announced its crude price increase it stated that it would absorb the higher cost and would not increase products prices unless it became necessary "to follow to protect supplies for our customers." Most smaller refiners, however, insisted that they are in no position to absorb higher crude prices of this magnitude, pointing out that all their other costs have also been advancing in recent months.

The new crude price increase is the fifth since price controls were dropped in the summer of 1946. The Office of Price Administration had permitted an increase of 10 cents per barrel, effective in March 1946, above the ceilings which had prevailed during the war, thus bringing the price of 36° gravity Oklahoma crude, for example, to $1.27 per barrel. With price ceilings removed there was a general increase of 25 cents per barrel that July, and another 10-cent increase in November. This year prices were increased 25 cents per barrel on March 10 and 20 cents on October 15.



Industry, Government Leaders Lay Plans for Voluntary Allocation

by Bertram F. Linz

WASHINGTON.—Congressional studies of supplies and distribution of petroleum products, steel, and other scarce materials, the European aid program, and the administration's anti-inflation proposals centered this week in a round-table discussion before a subcommittee of the Senate interstate commerce committee headed by Sen. Charles W. Tobey of New Hampshire.

Officials of government agencies, trade associations, oil and other companies opened the forum December 9 with oil industry men denying that there is a general oil shortage and attributing difficulties in Northeast states to transportation problems which they are making every effort to correct.

Howard W. Page, assistant to the president of Standard Oil Co. (N. J.), told Tobey supplies of oil this year have increased as much as, if not more than, demand, and his company is recalling for domestic service some of the 84 tankers it has in foreign trades, adding his company would like more tankers but private charter rates are more than double the Maritime Commission scale.

Tobey endeavored to have Page agree that production in this country was being hampered by the export of "hundreds of thousands of tons" of steel to Saudi Arabia, but the latter explained that more oil per ton of steel could be produced abroad than in this country. Page also disagreed with Tobey's suggestion that Mexico is "reeking of oil" which could be imported, asserting that country has no supplies available for us. He told Tobey the American companies hold no "resentment" over the expropriation of United States properties 10 years ago and, if Mexico had a reasonable law, the companies would be willing to go back and attempt to develop the country's resources.

All efforts to sell government-owned tankers foreign have been halted, it was disclosed by Maritime Commissioner Granville Mellen.

At the same hearing Governor Bradford of Massachusetts asked prompt enactment of legislation permitting oil companies to return to the wartime practice of pooling information and supplies without fear of anti-trust prosecutions and the supply of additional tankers and tank cars for the New England area.

Elsewhere at the Capitol probed questions of shortages, exports, controls, voluntary allocations, and inflation curbs, with little prospect that a definite program would jell before Christmas.

In the Senate appropriations committee, Sen. Styles Bridges of New Hampshire last week raised the question of exports to Russia and told Undersecretary of State Lovett he wanted full information on shipments made since the expiration of lend-lease last December 31. Sen. William F. Knowland of California supported Bridges, declaring that oil-production equipment badly needed in this country was shipped to Russia this year.

Interior and Commerce Department officials continued their almost daily trips to the Capitol last week to press the president's program. Before the joint committee on economic report December 5, Acting Secretary of the Interior Oscar L. Chapman disclosed that within a few days the department will come up with a "long-range program" to expand our natural resources base, in which he indicated synthetic-fuel production will be suggested as one means of meeting future requirements.

Giving more detail about the industry's drilling, production and allocation activities, Robert E. Friedman, assistant director of the OGD, in answer to questions said "controls would be avoided at all cost, if possible," but might be employed if a sudden need arose.

On the other side of the Capitol, the House interstate commerce committee belatedly joined the procession of oil investigators with an announcement by Chairman Charles A. Wolverton of New Jersey that it would start an over-all inquiry this week which will cover "sources and amount of available supplies, present and future demands, and all related matters, including production, processing, distribution, and transportation," both foreign and domestic.

Earlier in the week Secretary of Commerce W. Averell Harriman told the Senate appropriations committee that the interim-aid program calls for the shipment of 7,254,000 bbl. of oil to France and Italy but only 1,757,000 bbl. of this would move from the United States. That amount, he said, is only 4 per cent of the aggregate exports of oil and products anticipated during the period covered by the program, and the first quarter allocation for exports of products under control will be less than the current quota. Shortly after members of Congress expressed their distrust of Harriman's export program the Office of International Trade embargoed the export of bituminous coal of types used in this country for house heating.

So little impressed have been the several committees dealing with the proposals that few members have bothered to inquire into the cost involved in setting up any sort of control agency and the time required to get the machinery running.

Meanwhile, as the Republican high command ponders over the course it will adopt on the antiinflation program, congressional committees are widening their investigations.

Warren Petroleum Reported Buying Stock of Devonian Oil Co.

WARREN PETROLEUM CORP., Tulsa, is completing arrangements for the purchase of the stock of Devonian Oil Co., Tulsa, one of the oldest independent producing companies of the Southwest, according to reports the first of the week. The reported price for the common stock is $65 per share. The first of the year there were 322,000 Devonian shares outstanding.

The Devonian company's production last year averaged 5,600 bbl. daily and this year has been increased to a present production of more than 6,000 bbl. Company also has natural gas and natural gasoline production. Crude-oil production last year came from 606 wells located in the states of Arkansas, New Mexico, Oklahoma, North Central Texas, East Texas, South Texas and West Texas.

The company holds approximately 250,000 acres of undeveloped leases in several states including Wyoming. The proven reserves are estimated to total approximately 35,000,000 bbl.

The acquisition of the Devonian properties will mark another important step in the expansion of the Warren company operations. The company, which for several years has been one of the largest manufacturers and distributors of natural gasoline and associated products, last year acquired the production, transportation, and natural-gasoline properties of the Hanlon-Buchanan interests. The Warren company recently launched a large-capacity ship designed to transport liquefied gases.

Unit Operation Urged At Abilene Meeting

ABILENE, Tex.—Looking to an active period of anticipated new deep production and an accelerated program of secondary recovery, members of the West-Central Texas Oil and Gas Association met in Abilene December 8 for a day-long technical session marking their semiannual membership meeting.

At the membership banquet under presiding association president Tom F. Grisham, William J. Murray, Jr., Texas railroad commissioner reported on the progress in the reduction of Texas flare gas. He stated that although the recent state Supreme Court decision regarding the Seeligson case upheld the commission's authority to close in fields where waste occurs, the regulatory body will continue to strive for cooperation with and aid to the industry in reducing waste of a fuel of increasingly greater value to the nation's economy.

Merle Becker, I.P.A.A. president, addressing the group on current industry problems, cited important legislation pending in Congress. Both speakers reminded producers of the responsibility to meet demands with greater efforts in view of the recent improvement in the crude price structure.

The possibilities of finding new oil reserves and the means for improving recovery of those reserves already developed occupied much of the attention of the 200 members attending the technical sessions. New deep strikes are considered highly probable with improvement in exploration methods and the sections from the lower Strawn to the Ellenburger are considered particularly promising. Dr. Frank B. Conselman, Abilene geologist, outlined the deeper prospects following a progress report on the work of the Abilene Geological Society study group which has drawn up a tentative correlation of West-Central Texas formations.

The subject of increased conservation through unit operation, a measure in which the region was admitted to be lagging, occupied much discussion. Discussion of the Williams oil and gas unit by J. C. Hunter, Jr., covered the pertinent points of the district's model operation of its kind declared by later speakers as an ideal case of cooperation and applied engineering. In his discussion on the operating aspects of unitization and cooperation agreements, Ernest Funkhouser of Woodley Petroleum Co., strongly advocated early cooperation between operators developing a field either through field engineering committees or through free discussion of problems between operators to the end that waste be prevented before it occurs and sound pressure maintenance measures be effected to augment ultimate recovery of oil and gas.

Operators were told previously by Earl W. Jones, Abilene petroleum engineer, what the engineer could do for old and new fields in the district. Regarding the legal aspects of unitization and cooperative agreements, R. M. Wagstaff, an Abilene attorney, stressed the importance of facilitating later unitization by obtaining common leases covering separate tracts or inclusion of permissive unitization clauses when first assembling blocks for development.

Opinions expressed privately at the meeting indicated that the recent price increase would result in increased oil recovery by immediate halting the recent trend of abandonment of stripper wells for recovery of casing.

Shell Dedicates New Houston Laboratory

HOUSTON.—Shell Oil Co., Inc.'s, new Production and Exploration Research Laboratory was formally opened here December 5 in dedication ceremonies attended by a number of high-ranking officials of the Shell organization and other companies.

The laboratory building, a three-story welded steel structure (see picture, opposite page), represents the last word in petroleum research facilities. Construction has been under way about a year and a half.

Alexander Fraser, president of Shell Union Oil Corp.; H. M. S. Burns, president of Shell Oil Co., Inc.; James H. Doolittle, vice president of Shell Union; and a number of directors of Shell Union were present for the dedication. A number of comments on current conditions in the oil industry were made by Shell officials at a press conference earlier in the day.

Discussing general economic conditions, Fraser said profits, including Shell's, look large when published, but are worth very much less today than prewar. "In 1937, it took $7.45 worth of refinery equipment to produce a gallon of gasoline; today it takes $27.40 worth of equipment to produce a gallon of gasoline . . ." he said. "Thus a company such as Shell, with a substantial investment in equipment, plant, and other facilities is caught in a vice between the necessity of replacing its plants and equipment, and the reduced purchasing power of today's dollar."

As for future oil discoveries, Fraser said he felt confident that when the figures are made available for the present year, there will be no overall decrease in the nation's reserves.

In response to a question, the Shell Union president said the crude-oil pipe line which Shell was reported planning from West Texas to California, is "still in the talking stage."

At the conference, Doolittle spoke briefly of research being carried on by Shell on jet fuels.

Principal speaker at the dedication was E. O. Thompson, chairman of the Texas Railroad Commission, who said the need for research is great "because the oil industry must be increasingly progressive and active in finding new supplies of oil and learning how to get more oil from these oil fields."

H. S. M. Burns, president of Shell Oil Co., Inc., in another talk at the dedication, said Shell during 1947 commenced in the Houston area projects involving capital expenditures totaling some $50,000,000. The total, he said, includes Shell Chemical Corp. *(A detailed description of the new Shell laboratory will appear in an early issue of The Oil and Gas Journal.)*

At the speakers' table during the dedication of Shell Oil Co., Inc.'s new production and exploration research laboratory in Houston were, left to right, T. E. Swigart, president, Shell Pipe Line Corp.; H. S. M. Burns, president, Shell Oil Co., Inc.; Mayor Oscar Holcombe, Houston; Alexander Fraser, president, Shell Union Oil Corp.; E. O. Thompson, chairman, Texas Railroad Commission; and Dr. Harold Gershinowitz, director of the new laboratory

this week

PRICES— Slow-spreading crude price increase becomes general as major companies fall into line behind Sun Oil Co.'s 50-cent general advance. . . . Pennsylvania Grade crude also moves up with new top of $5.00. . . . Mid-Continent products prices react immediately with Standard Oil Co. of Ohio leading off in announcement of 1 1/2-cent gasoline and distillate-oils advance and 1 3/4-cent boost in residual oils.. . . . Refiners agree crude price hike will not be absorbed by industry. . . .

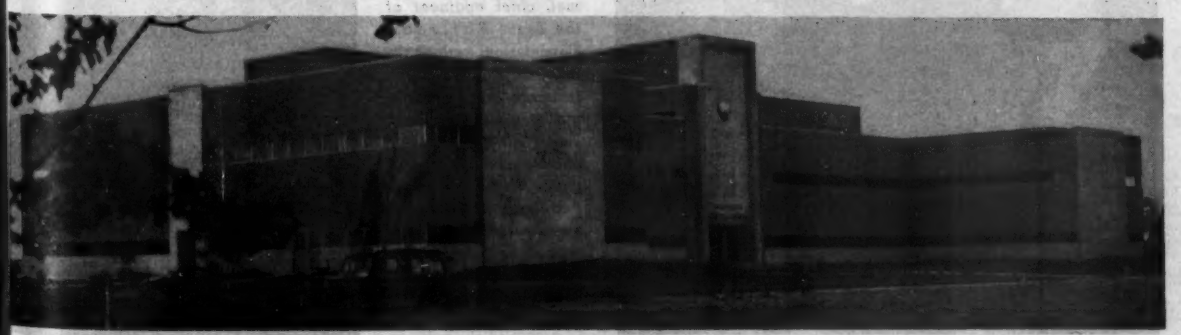
TRENDS— U. S. crude-oil production for the week ended December 6 averages 5,285,605 bbl. daily, a decrease of 17,630 bbl. from the previous week. . . . ¶California reaches all-time high with 932,100 bbl. daily, an increase of 8,400 bbl. . . . ¶Well completions total 694, an increase of 30 over previous week and an increase of 169 as compared to completions for week ended December 7 a year ago. . . . Wildcats for week ended December 6 total 123 compared to 100 for previous week. . . . ¶Crude runs to stills total 5,309,000 bbl. for week ended November 29, an increase of 80,000 bbl. over the previous week and an increase of 610,000 bbl. compared to same period a year ago.

INTERNATIONAL— Mene Grande Oil Co. plans 20,000-bbl. daily refinery near Puerto la Cruz, Venezuela. . . . Plant is scheduled to be in operation by end of 1950 under newly formed Venezuela Gulf Refining Co. . . . Mene Grande president says company plans to invest $100,000,000 in Venezuela during 1948. . . . ¶Cie. Francaise des Petroles, which holds nearly 25 per cent of Iraq Petroleum Co., Ltd., raises its company capital to 5,222,000,000 francs to back exploratory and development activities of Iraq Petroleum. . . . Plans call for expanded activities in Qatar, western and southern Iraq, Lebanon, Syria, Palestine and Trans-Jordan. . . .

PIPE LINE— Preliminary work begins on Tennessee Gas Transmission Co.'s 30-in. third loop in anticipation of FPC hearing. . . . A 24-in. extension line would run from Kentucky to near Boston. . . . Tennessee Gas completes a 28.3-mile section of its second looping program between Shaw and Ruleville, Miss. . . . ¶Atlantic Pipe Line Co. increases capacity of main crude line system from Midland to Atreco.. . . . ¶Magnolia Pipe Line Co. reaches midway point of 647-mile 20-in. line from Corsicana, Tex., to Patoka, Ill. . . . ¶Texas Pipe Line Co. awards contract for construction of 107-mile products line from Hearne to Austin to San Marcos, Tex. . . . Work is scheduled to begin January 1. . . .

COMPACT— Interstate Oil Compact Commission economics advisory committee at its winter quarterly meeting forecasts 6 per cent increase in U. S. petroleum demands in 1948. . . . Demands expected to be particularly high in the first and fourth quarters of next year. . . . East Coast will become most difficult area for meeting all oil requirements. . . . ¶Gov. Beauford Jester of Texas is elected 1948 chairman. . . . ¶Nineteenth anniversary of Oklahoma City field discovery is celebrated. . . . ¶Commission endorses state laws for compulsory unitization. . . . Declares free enterprise is solution to oil industry's problems. . . .

Bottom: General view of the Shell Oil Co., Inc.'s, new production and exploration research laboratory which was dedicated in Houston December 5. Right: Standard laboratory unit in the new structure



Free Enterprise Solution to Oil Industry's Problems, Compact Told

by Henry D. Ralph

OKLAHOMA CITY.—The petroleum industry faces the most serious problems in its history but they can be solved by free enterprise and wise state legislation and without centralized federal regulation, the Interstate Oil Compact Commission was told by virtually all who addressed its winter quarterly meeting here December 4-6.

The theme of state rights as against federal control was stressed most heavily in discussion of the Supreme Court's decision in the so-called tidelands case, which several speakers said advances a new doctrine of federal dominion and paramount rights which can be expanded to permit the Government to take all natural resources without compensation unless Congress enacts corrective legislation.

Coincident with the meeting was a city-wide celebration of the nineteenth anniversary of the discovery of Oklahoma City field, and the history of this field was used by many speakers as an example of the wealth created by the oil industry, the growth of the Compact, progress in engineering, need for state regulation of conservation, and problems faced by the industry.

Official representatives of 18 of the 19 member states were among the more than 200 persons in attendance, including the governors of Oklahoma, Texas, Kansas, and Illinois.

Highlights of committee reports and general sessions of winter meeting of Interstate Oil Compact Commission:

Forecast an increase of 6 per cent in demand for 1948.

Rallied inland states to support legislation offsetting Supreme Court tidelands decision.

Approved rotation of officers and elected Gov. Beauford Jester of Texas as 1948 chairman.

Endorsed state laws for compulsory unitization.

Suggested state action to control wild wells and fires.

Advanced committee surveys of unit operations, secondary recovery projects, and stripper well reserves.

Celebrated nineteenth anniversary of Oklahoma City field discovery.

Heard Marshall plan for European aid described as essential despite its cost to domestic oil industry.

Heard free enterprise system and I.O.C.C. principles endorsed as solution to oil industry's problems.

Deliberately breaking the custom of reelecting officers, the Commission agreed that now that the Compact includes such a large number of states it should adopt the policy of rotation of office except in extraordinary circumstances. Gov. Beauford Jester of Texas was elected chairman for 1948, with E. Leland Richardson of Louisiana first vice chairman and Don T. Andrus of Pennsylvania second vice chairman.

The 1948 executive committee will be composed of the official representatives of the states of Texas, New Mexico, Illinois, Kansas, Oklahoma, Colorado, and Arkansas.

Jones Discusses Shortages

One of the principal addresses was by W. Alton Jones, president of Cities Service Co., who declared that the present outlook for oil provides cause for serious thought in that for the first time in its history the industry is unable to supply readily all the peacetime demands of its customers. Analyzing the causes of this, Jones gave as one reason the fact that science came late to the oil industry, saying that if the Compact had been created 50 years earlier the

A. W. Ambrose, president of Cities Service Oil Co. (Del.), with plaque presented by Mid-Continent Oil and Gas Association commemorating discovery of Oklahoma City field. Celebration of the nineteenth anniversary of this discovery was a feature of the winter meeting of the Interstate Oil Compact Commission

Left: Heads of important study groups of Interstate Oil Compact Commission. Shown are R. J. Gonzalez, director of economics, Humble Oil & Refining Co. and chairman of I. O. C. C. economics advisory committee; Jack K. Baumel, chief engineer of the Texas Railroad Commission and chairman of the I. O. C. C. research and coordinating committee; Fred Van Covern, director of department of statistics of the American Petroleum Institute and member of the I.O.C.C economics advisory committee

nation would have been richer by many billions of dollars.

The chief danger in the present petroleum situation is that the industry's rapid growth may outrun the growth of public understanding, Jones said, but time and the play of those forces inherent in free enterprise will increase production and meet the challenge of service which the public has thrown down.

In his address of welcome, Gov. Roy J. Turner of Oklahoma declared that oil and gas legislation in his state has kept abreast of changing conditions, and with legislatures which understand conservation problems the future promises legislation in keeping with practical and scientific knowledge.

Responding to this, Gov. Dwight H. Green of Illinois cited the tidelands situation as an attempt of the federal Government to obtain, by indirect means, control of natural resources heretofore in the hands of the states, and said the Supreme Court decision enunciated a new principle which might be applied to effect the nationalization of all property useful or vital to the national defense. It is clearly the duty of Congress to nullify the effect of the decision and preclude future efforts to upset the established rights of the states and the American system of free enterprise and private property, he added.

Even stronger language was used by Rex Baker of Humble Oil & Refining Co. in discussing conservation on the Continental Shelf. The public, he said, does not realize the importance of the tidelands decision since under it the way is opened for the federal Government to nationalize all natural resources, upland as well as submerged, without compensation and whether now owned by states or private owners. This is a serious threat to the institution of private property, Baker said.

The chairman of the Compact Commission, Hiram M. Dow of New Mexico, reporting on the history and recent accomplishments of the organization, noted that when the war ended it had been expected that the federal Government would step out of the oil-control picture but this has

(Continued on page 157)

Compact Group Sets 1948 Demand At 6,200,000 Bbl. Daily

OKLAHOMA CITY.—Total United States petroleum demands in 1948 will be about 6,200,000 bbl. daily, or nearly 6 per cent higher than in 1947, it was forecast by the economics advisory committee of the Interstate Oil Compact Commission at its winter quarterly meeting here December 5.

For the entire year 1947 the industry will meet demands 10 per cent greater than last year and one-third larger than in 1941, the committee said, adding that this demonstrates that voluntary efforts can be counted on to meet the new requirements.

Demand will be especially high in the first and fourth quarters of next year because of winter consumption of heating oils, and low stocks and distribution problems may cause temporary local difficulties, the committee said in placing fuel oil demand figures at the top limit of anticipated supplies.

Imports of 475,000 bbl. daily, an increase over current imports, was assumed for 1948, and also a decrease of 12 per cent in exports due to anticipated greater dependence of foreign markets on foreign supplies.

Domestic crude production will have to average 5,385,000 bbl. daily in 1948, about 100,000 more than the current rate, and to rise to 5,450,000 bbl. daily in the last half of the year to meet demands, it was estimated, and refinery runs will have to expand at the same rate.

In its general observations the committee declared that continuation of maximum supply efforts, together with excellent coordination, should make it possible to meet the anticipated increase in demands for 1948 if everything works out favorably, although difficult supply problems for the next few months will continue to cause temporary trouble in local areas.

The report remarked that transportation must be improved by placing more tankers in East Coast service immediately, by expanding tank car shipments to the Midwest, and by hastening completion of new pipe lines; that the industry will require a very large tonnage of steel to expand its capacity to meet the demand; and that conservation by consumers should be encouraged as a very important factor in balancing demand and supply.

The principal supply problems now and for 1948 are in the East Coast and Midwest areas, both due to transportation, the committee said, adding that the Midwest outlook is improving somewhat but the East Coast supply situation is becoming more difficult and serious problems will exist in meeting all heating oil requirements in this area.

A companion forecast prepared by the supply and demand committee of the Independent Petroleum Association of America coincided rather closely with that of the compact committee. It assumed somewhat lower imports and higher domestic crude production, forecasting the latter at 5,330,000 bbl. daily the first quarter of 1948 and at 5,440,000 the second quarter.

The compact committee report, presented by Chairman Richard J. Gonzalez, summarized its forecast in the accompanying table.

UNITED STATES PETROLEUM SITUATION
(Figures in thousands of barrels daily)

	1947 estimate		1948 projection				
Demand:	Fourth quarter	Year	First quarter	Second quarter	Third quarter	Fourth quarter	Year
Gasoline	2,300	2,294	2,125	2,550	2,625	2,425	2,430
Kerosene	375	303	415	250	220	410	325
Distillate fuel oil	1,025	886	1,275	790	720	1,125	975
Residual fuel oil	1,480	1,438	1,595	1,400	1,370	1,515	1,470
Others	975	948	885	1,000	1,115	975	995
Total demand	6,155	5,869	6,295	5,990	6,050	6,450	6,195
Domestic demand	5,730	5,410	5,925	5,570	5,625	6,065	5,795
Exports	425	459	370	420	425	385	400
Supply:							
United States crude production*	5,300	5,078	5,300	5,350	5,450	5,440	5,385
Natural gasoline	365	357	375	380	390	395	385
Imports	420	432	410	450	520	520	475
Total supply	6,085	5,867	6,085	6,180	6,360	6,355	6,245
Stock changes:							
Four major products	—87	—15	—184	151	303	—135	35
Refinable crude oil	20	5	—15	—5	40	40	15
Others	—3	8	—11	44	—33	0	0
All oils	—70	—2	—210	190	310	—95	50
Closing stocks (million barrels):							
Four major products†	217.0	217.0	200.3	214.0	241.8	229.4	229.4
Refinable crude oil	227.0	227.0	225.6	225.1	228.8	232.5	232.5
Others	63.0	63.0	62.0	66.0	63.0	63.0	63.0
All oils	507.0	507.0	487.9	505.1	533.6	524.9	524.9
Crude runs to stills	5,255	5,059	5,300	5,325	5,425	5,440	5,373

*Forecast shows amount required to meet demand and indicated stock changes. †Includes California heavy crude oil.

International

WORLD-WIDE OIL DEVELOPMENTS

French I.P.C. Partner to Increase Capital for Crude-Line Building

TO provide capital for its share in the postwar exploratory and development activities of Iraq Petroleum Co., Ltd., Cia. Francaise des Petroles (a 23.75 per cent holder in I.P.C.) has agreed to raise its company's capital to 5,222,000,000 francs.

This program provides for continued construction of the two 16-in. crude-oil lines, paralleling existing 12-in. lines, from Iraq's Kirkuk field to Haifa and Tripoli, as well for expanded activities in Qatar, western and southern Iraq, Lebanon, Syria, Palestine and Trans-Jordan.

The president of Cie. Francaise took occasion to note that there is now full agreement between his company and the other I.P.C. partners. The reference obviously was to the situation which existed earlier this year over the validity of the "Red Line Agreement." Cie. Francaise, in fact, has agreed not to withdraw its suit against Near East Development Corp. — jointly owned by Standard Oil Co. (N.J.) and Socony-Vacuum Oil Co., Inc. This United States corporation and major shareholder in I.P.C. is determined to seek a declaratory judgment against the 5 per cent I.P.C. partner, C. S. Gulbenkian, if the latter and Near East Development cannot agree outside of court. But despite the fact that the suit has not been withdrawn, Cie. Francaise is perfectly satisfied with subsequent negotiations.

Irony of Situation

The irony of this situation, however, is that the provisional conditions to which the French expressed satisfaction will not be carried out unless the prewar I.P.C. contract is legally declared void.

Meanwhile, Reuters reports from Paris that the crude-oil production in Pechelbronn—the only oil field in France—reached 4,282 tons (about 32,115 bbl.) in October compared with a monthly average of 3,500 tons (about 26,250 bbl.) at the beginning of 1947.

This slightly increased production reportedly is due to the rapid rehabilitation and modernization of the Pechelbronn company's plants, which suffered serious damage during the war.

Reports Show Gasoline Shortage as World-Wide

Indicative of the continued worldwide shortage of gasoline are the following recent reports from five additional countries:

Argentina — The government has taken numerous measures to conserve this country's supplies. Among the measures are: plans to increase the local production; passenger or freight vehicles of more than 5 tons must be run by diesel engines; alcohol is to be mixed with gasoline in regions where alcohol is manufactured; and owners of private cars have been requested to use vehicles of less than 20 hp.

Spain—Additional measures are being adopted following recent gasoline use restrictions to prohibit hoarding supplies and to further restrict sales at service stations. "Campsa" is still the Spanish monopoly which controls gasoline distribution.

Sweden—Since early in November, trucks, motorcycles, and private cars have been forbidden to travel on Sundays and public holidays without a government permit. All motor racing and air shows have been cancelled.

Syria and Lebanon—Gasoline has become largely a black-market commodity since Socony-Vacuum Oil Co. cut deliveries in November to 70 per cent of the October demand. Furthermore, the company has explained, due to the world shortage of refining capacity, that fuel-oil reductions also will be effected shortly. In Lebanon the legal price of gasoline reportedly is 70 cents an imperial gallon. Shell and other product suppliers in Syria and Lebanon indicated that they too may reduce over-all deliveries. Socony-Vacuum reduced its deliveries to its share of the gasoline output of the small, war-built 5,000-bbl. topping plant of Iraq Petroleum Co., Ltd., at Tripoli, Lebanon. Socony owns a 11.87 per cent interest in I.P.C.

Mene Grande Will Build Puerto la Cruz Refinery

A NEW refinery with a minimum capacity of 20,000 bbl. daily will be built near Puerto la Cruz, Venezuela, by Mene Grande Oil Co. through the newly formed Venezuela Gulf Refining Co.

C. M. Crebbs, Mene Grande president, said that while plans for the refinery's construction have not been completed, the refinery is scheduled to be in operation by the end of 1950.

Speaking at a press conference in Venezuela, Crebbs said the Mene Grande company plans to invest $100,000,000 in Venezuela during 1948. It will, he said, increase the number of drilling rigs operating there and during the year will increase its production of crude oil, now about 210,000 bbl. daily.

The company also is studying plans for installation of cycling plants in producing areas other than Guara and Oficina, where new cycling plants will go into operation in the near future.

Pointing out that during 1947 Mene Grande spent more than $36,000,000 in housing projects for its workers, Crebbs said that an additional $43,000,000 is expected to be spent during 1948 in a continuation of these construction plans.

Tarakan Output Up

Indicative of how the crude-oil production of N.V. Tarakan Petroleum Mij. (Royal Dutch-Shell subsidiary) has increased, over a year's time, is the fact that the output on Tarakan Island, Borneo, approximated 5,800 bbl. daily for the second quarter of this year compared with 3,500 bbl. for the same period in 1946.

World Developments Point Further Toward One-World Conception

International

by Warren W. Burns

FOREIGN oil developments which point to the need for practically all oil men to have at least a working knowledge of operations outside of the United States are increasing in number and complexity. In fact, developments in the field of international oil alone would seem to indicate that we are rapidly approaching the economic, as well as the political, concept of one world.

And indications that the independent oil men are taking an increasing important role in foreign oil developments come from many sources. Currently, Petrol Corp. of Philadelphia has the spotlight following last week's announcement that it planned to purchase 800,000 bbl. a month of royalty oil at a premium from the Venezuelan Government. Within the next few days, this same company probably will be consummating a similar deal with the Venezuelan Government whereby an additional amount will be purchased. These deals are for 2-year periods with option renewals.

Reliable sources report that in its dealings with Venezuela, a so-called "schedule of acquisition" was set up whereby Petrol will lift various grades of crude at different times. For instance, in the first stage, slated to commence next February, about 17 different grades will be lifted. During the second stage, liftings will be largely confined to high-premium crudes, and in the third stage to asphalt. The fourth stage presumably is undecided, but when the announcement is made, it is thought that liftings will approximate another 800,000 or 1,000,000 bbl. per month. In all, Venezuela has about 59 grades of crude oil, some of which are blends.

In Petrol's dealings with the Venezuelan Government, company officials generally acknowledge that the purchases will be confined to the period of petroleum shortages, and not alone in the United States. Exactly how Petrol will dispose of all its 1,800,000 bbl. monthly crude purchases is not yet known. But it appears that approximately 900,000 bbl. may be used in the Texas City 30,000-bbl. a day plant which Petrol purchased from War Assets Administration.

Petrol's purchases of Venezuela's royalty oil, at premiums approximating 20 cents per barrel, are hedged in by an agreement with the Venezuelan Government whereby Petrol is not to resell crude to brokers or intermediates, although the company may use the crude for barter purposes.

Commenting on the sale to Petrol, Fomento explained that this negotiation with Petrol, plus other purchases for royalty crude oil, totals about 26,820,000 bbl., or around 54 per cent of Venezuela's crude oil available at deep water ports.

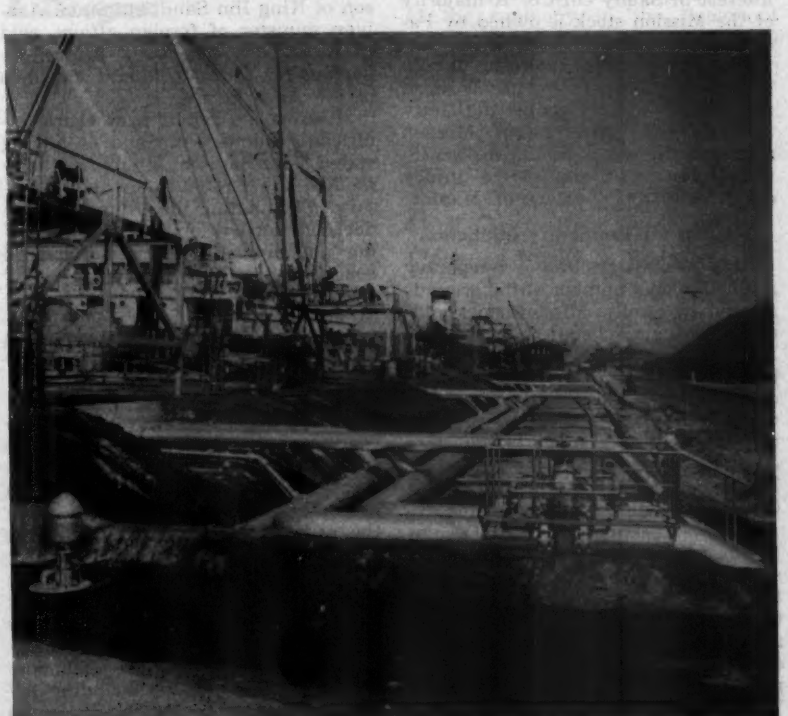
Guaranty Clause

The guaranty clause, inserted by the Venezuelan Government, is probably due, in part, to the strong objections which were made concerning the royalty premium negotiations by the operating oil companies in Venezuela. In overruling the objections, the Venezuelan Government freely admitted that it realized such sales were made possible only because of the extremely tight world oil supply and that the sales were being made as the Venezuelan Government needed extra dollars to improve the nation's economic position.

Other foreign oil developments in which the independents are active includes the bidding of American Independent Oil Co. (the Ralph K. Davies group) for the Kuwait neutral zone in the Middle East. As of early this week it was a good bet that the Sheikh of Kuwait would sign over his preferential rights to one of the large oil companies now operating in the Middle East. But if this is done it should not be assumed that the independents have been "squeezed out." Far from it. For while the competitive bidding may register a victory for a major company in the Kuwait neutral zone, the independents hold an ace in that Arabian American Oil Co., in particular, is most desirous of seeing that the American Independent Oil Co. gets a hold in the Middle East. And this could be easily accomplished by Aramco, in effect, giving up some of its vast concession area in Saudi Arabia, and probably an area where the possibilities of finding oil were more than just remote.

Meanwhile, it is believed that Aramco, or some affiliated Middle East company, may agree to sell crude oil to the Davies' group. This crude, presumably, would be transported in the eight tankers just purchased by American Independent. Transportation of this crude, say to the East

(Continued on page 157)



Loading terminal of Mene Grande Oil Co. at Puerto la Cruz, Venezuela, from which port Petrol Corp. soon will begin loading Venezuelan royalty oil. Puerto la Cruz also is the proposed site of Mene Grande's newly announced refinery

Confused Skelly Merger Question Nearing Final Settlement

THE much-litigated proposal to merge Mission Corp. into Sunray Oil Corp. crossed several legal hurdles during the past week but faced one more as the deadline approached for completing the involved transactions.

The remaining hurdle was the hearing set for December 10 in San Francisco before Judge Albert L. Stephens of the federal Circuit Court of Appeals for the Ninth District. It will be an appeal from the temporary injunction issued December 3 by Federal District Judge Roger Foley in Carson City, Nev., to prevent a meeting of the stockholders of Mission to vote on the proposed merger.

Meanwhile, on December 5, Federal Judge Leon Yankwich in Los Angeles denied a motion for an injunction to prevent Pacific Western from voting its stock in favor of the merger. Judge Yankwich dismissed the suit on the primary ground that it was within the jurisdiction of the federal court in Nevada.

Both injunctions had been sought by W. G. Skelly, president of Skelly Oil Co., who is a director, stockholder, and former president of Mission, which company owns a controlling interest in Skelly Oil Co. A majority of the Mission stock is owned by Pacific Western Oil Corp., which is controlled by the Getty interests. It also is planned to merge Pacific Western into Sunray. Skelly claims the Getty interests and directors of Mission arranged the terms of the merger to their own profit and to the injury of minority stockholders of Mission.

Grounds for Temporary Injunction

Judge Foley granted a temporary injunction on a number of the grounds alleged by Skelly. Mission stockholders held their scheduled meeting in Reno, Nev., December 6, but in view of the injunction they did not vote on the merger. Now that this injunction has been set aside they planned to meet again December 11 and vote on the plan, but the merger cannot be made effective until the Circuit Court proceedings are completed.

Sunray stockholders voted December 5 to approve the merger, and stockholders of Pacific Western met the same day but deferred a vote until December 9. On December 8 the stockholders of Tide Water Associated Oil Co. voted to purchase at $25 per share the 1,923,447 shares of Tide Water common stock now held by Mission and Pacific Western whenever or by whomever offered. Under the merger terms Sunray had agreed to sell this stock to Tide Water as soon as it obtained control of the other two companies.

One of the arguments used by Mission in appealing Judge Foley's temporary injunction to the Circuit Court was the urgency of the case, since the merger agreement provides that it must be completed by December 23. Before this date the stockholders of all affected companies must approve it, Sunray must complete a new registration with the Securities and Exchange Commission, and reports of the deal must be filed with the Department of Justice. Mission pleaded that it has already spent $300,000 in preliminary expenses, which will be lost if the merger fails.

(A summary of the merger terms and of Skelly's complaint was printed in The Oil and Gas Journal of November 8, 1947, page 32.)

Concessions at Stake in Palestine Partition Fight

The government of Saudi Arabia will have to decide if any changes are to be made in that nation's oil concessions, Prince Feisal, second eldest son of King Ibn Saud and Saudi Arabian minister of foreign affairs, said in New York this week before departing for Cairo to attend meetings of the Arab League.

Meanwhile a report from Cairo unofficially quotes Ibn Saud as having stated that he would approve any method the Arab League felt necessary in combating the United Nations decision to partition Palestine including the ending of the American oil concessions in his country.

Railroads Ask Further Freight-Rate Increase

WASHINGTON.—Increases in operating expenses incurred since their second application for freight rate increases was filed last September 5 are reflected in a new petition from the railroads to the Interstate Commerce Commission to raise the proposed rates by an average of 5 per cent.

The new application, filed December 3, would make the proposed increase in rates on tank-car shipments of crude and products, including asphalt, 10 cents per 100 lb. The rates on iron and steel and manufactures thereof would be increased 11 cents per 100 lb. but not in excess of $2.20 per ton.

Boyd Predicts Widespread Use of Radio in Industry

Widespread use of radio in virtually every phase of the oil industry was predicted by William R. Boyd, Jr., president of the American Petroleum Institute, following application of F. W. Littell, Shell Pipe Line Corp., to the Federal Communications Commission for an expanded radio service for the industry.

Littell has been named head of a new central committee which will correlate the Institute's radio activities. Joseph E. Keller, National Petroleum Association, Washington, has been named secretary of the committee. *(For details of Littell's application, see The Oil and Gas Journal, November 29, page 99.)*

Record Sale Conducted on Texas University Lands

A record total of $4,596,700 in bonuses were bid last week in the twenty-first public auction of oil and gas leases on University of Texas lands.

The bids covered 115 tracts totaling 33,619 acres in Andrews, Crane, Crockett, Irion, Pecos, Reagan, and Ward counties.

Previous record of bids was a total of $3,665,900 set in 1944. Leases are awarded the highest bonus bidders. The university retains a one-eighth royalty of the gross production. Largest single bid in the latest sale was one of $320,000 made by Ohio Oil Co. for a 330-acre tract in Andrews County.

Wolf's Head Acquires 250 Producing Wells

Wolf's Head Oil Refining Co., Inc., has acquired the entire Pennsylvania crude-oil producing properties of the Grant interests in Franklin field, a heavy district crude field.

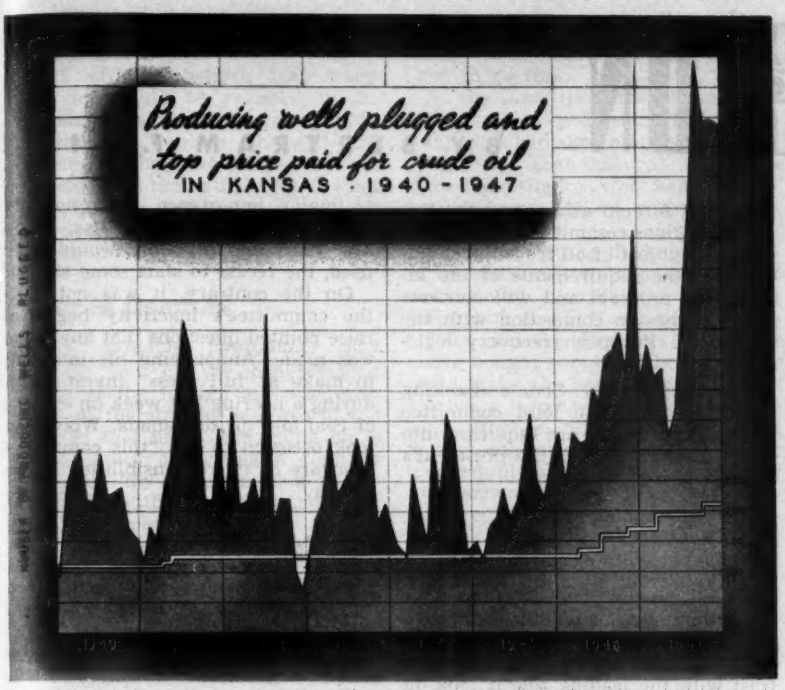
Properties involved include about 250 producing wells on 1,500 acres of leases.

Wolf's Head also was reported purchasing Franklin Pipe Co., which operates a pipe-line gathering system in the field.

Amerada Leases 300,000 Acres from Canadian Firm

Amerada Petroleum reportedly has leased about 300,000 acres for petroleum exploration from Calgary & Edmonton Corp., Ltd.

L. D. M. Baxter, president of the Canadian firm, said Amerada is expected to begin exploratory work in the area, which lies about 60 miles north of Calgary, as soon as weather permits.



Growing Shortages of Materials Studied by I.P.A.A. Committee

by Charles J. Deegan

THE gradually worsening materials shortages, particularly as viewed by the independent operator, provided the theme of a meeting last week in Tulsa of the Materials Shortages Committee of the Independent Petroleum Association of America.

President Merle Becker, speaking at a dinner meeting presided over by George F. Martin, Tulsa independent, pointed out many of the association's current problems, most of which hinged on the materials shortages.

Referring to the Marshall Plan as an ambitious program for shifting from a coal-fuel economy to a petroleum economy, Becker said a lot of water must be squeezed out of current proposals because there are not enough materials available to make such a drastic shift.

European plans, he said, call for a 100 per cent increase in petroleum consumption in 1951, compared to 1938, while plans call for an increase of only 10 per cent in coal production.

Becker reiterated the association's opposition to steel exports and the proposed Anglo-American oil treaty and commended the Federal Power Commission for establishing the status of independent producers and gatherers of natural gas.

The seriousness of the shortage of oil-field tubular goods was emphasized before the Materials Shortages Committee session by the accompanying chart, which shows the sharply rising trend of well abandonments in Kansas, contrary to a normal decline when oil prices increase. Discussion brought out opinions that abandonments to secure pipe and tubing were resulting in a production loss of 4,000 to 5,000 bbl. daily and a permanent loss of proven reserves of 8 to 15 million barrels.

Resolution Adopted

The committee adopted a resolution to be forwarded to the Interstate Oil Compact Commission and all state regulatory bodies asking them to "carefully consider the importance of, and the most effective use of, oil-field tubular goods in establishing rules, orders, and regulation pertaining to well spacing, production allocation, casing programs, and other conservation measures."

The committee, headed by J. E. Warren, also unanimously approved the sending of a series of recommendations to heads of all steel companies. In its report the group cited the "inequitable distribution of steel" and the belief that shortages of oil-country tubular goods "will cause shortages of domestic production."

Recommendations to the steel companies included:

1. Allocation of a larger percentage of total steel to manufacturers of oil-country tubular goods, since crude demand is 77 per cent higher now than before the last war and production of tubing and casing is only 2 per cent greater.
2. A check by steel companies on distributing supply companies to insure that only actual users will receive available supplies, and speculators not actually engaged in oil production will receive none.
3. Inauguration of an allocation system under which independent or nonintegrated oil producers will receive their fair share of goods.
4. Arrangements with distributors whereby reasonable stores of casing and tubing will be set up at strategic centers in the oil country so that legitimate operators may obtain casing necessary to test bona fide exploratory wells.
5. Holding to a minimum the shipment of tubular goods to foreign countries.
6. Cooperation between producers and steel companies in collection of scrap iron, both here and abroad.

The committee emphasized its belief that the present situation "can be handled successfully within the industry by complete cooperation between steel producers and oil producers."

Sun Oil Plans $200,000 Production Laboratory

Sun Oil Co. has announced plans for construction of a $200,000 production and geophysical laboratory at Amelia, Tex., according to John G. Pew, vice president in charge of production.

The new plant, which eventually will concentrate in one location the now scattered experimental activities of the company in the Beaumont area, will be equipped to build and service seismograph equipment as well as to conduct research in exploration and drilling practices.

L. G. Ellis of the Beaumont division for Sun will be in charge of the new laboratory.

Unit Operation in West Cement Field Is Begun

Phillips Petroleum Co. last week took over operation of the Medrano sand zone of West Cement field, in Caddo County, Oklahoma, initiating the second unit operation program under Oklahoma's 1945 statute.

West Edmond field was the first, beginning unit operation October 1. By unit operation, production in West Edmond is expected to be increased from an original estimate of 18,000,000 bbl. to more than 31,000,000 bbl. *(For details of the engineering aspects of the West Cement field unitization plan, see The Oil and Gas Journal, December 7, 1946, page 80).*

Mid-Continent Tax Forum

The annual ad valorem tax forum of the Mid-Continent Oil and Gas Association will be held December 15-16 in the Edwards Hotel, Jackson, Miss.

WASHINGTON WATCHING

BY BERTRAM F. LINZ

Hearings Lineup

WASHINGTON.—A full dozen congressional committees currently are concerning themselves with oil, from one angle or another.

The intensity with which some of these inquiries are being pushed is indicative of a realization of the seriousness of the domestic supply situation and the potentially explosive effect of a domestic oil shortage on the results of next year's political campaigns.

Several of the committees are studying oil as involved in the interim aid program and will continue right on with studies of the long-range Marshall Plan. Others are directed at President Truman's request for authority to invoke controls on critically short materials and commodities, and still others are digging into the present and prospective supply situation.

Here is how the committees line up:

House interstate commerce committee is starting an exhaustive investigation of the fuel shortage, present and prospective, which over a period of weeks will go into all operations of the industry, foreign and domestic.

A Senate interstate commerce subcommittee headed by Sen. Charles W. Tobey, is studying means of preventing a fuel shortage in New England.

A House armed services subcommittee headed by Rep. Dewey Short of Missouri will inquire into the adequacy of our oil reserves, with special emphasis on ability to meet military needs.

Another armed services subcommittee headed by Rep. Paul Shafer of Michigan is studying future national rubber policy with respect to the synthetic industry based on petroleum.

A Senate small business subcommittee headed by Sen. Kenneth S. Wherry of Nebraska is investigating complaints of distributors that they have been cut off from their sources of supply, and also is interested in the tanker situation, steel supplies, and other matters bearing on the subject of fuel-oil availability.

The Senate judiciary committee is planning a hearing, postponed from December 3, on the Sunray-Mission merger, and upon the opening of the regular session next month will take up the tidelands legislation and the bill to amend the Natural Gas Act.

The Senate war investigating committee still has open its investigation of Navy oil purchases from Arabian American Oil Co.

Senate and House committees in charge of foreign affairs and the two appropriations committees are digging into the subject of oil from the standpoint of the requirements of the interim-aid program and will continue those studies in connection with the long-range European recovery legislation.

The House and Senate banking committees and the joint committee on economic report are inquiring into oil in connection with the president's antiinflation program.

Tardy Turn to Oil

WITH other committees already deep in oil investigations, the House interstate commerce committee last week took its first step in that direction, a tardiness in sharp contrast with the leading role it took on petroleum matters over a period of some 10 years.

Oil men will recall the effective work done by the petroleum subcommittee starting in 1934 and running through to the end of the war, when it made periodic investigations of the oil situation and sponsored much legislation needed to get the war machine started. For years its well-balanced reports proved an unscalable wall against New Deal attempts to secure federal controls.

Since the Republicans secured control of the House there has been no petroleum subcommittee, nor has the full committee done much in the field of oil. Several factors have contributed toward this situation.

For one thing, the committee has lost many of the Republican members who took a leading part in oil investigations even under Democratic management, 11 of the present Republican members being first termers in Congress.

Equally responsible, however, is the determination of Chairman Charles A. Wolverton of New Jersey to keep all the reins in his hands. Wolverton has steadfastly refused to set up any subcommittee, although his refusal brought about a minor revolt early this year when several members criticized the slowness with which legislation was being handled and demanded that the work be split up in the interest of efficiency.

During the regular session the committee devoted itself mostly to aviation matters, its only activities of interest to the oil industry being its hearings on the legislation to amend the Natural Gas Act.

It has been apparent since midsummer that oil would be a matter of major importance from now on and the committee could use, and a few years ago probably would have used, the recess to start some studies.

On the contrary, it was not until the committee's inactivity began to raise pointed questions that any move was made. Announcing his intention to make a "full dress" investigation during a hearing last week on exports of coal and oil to Canada, Wolverton took occasion to say "this committee is aware of its responsibilities in the matter."

Idle Tank Cars?

QUICKER turnaround is resulting in the loading of more tank cars than a year ago, but there is a difference of opinion as to whether there is any large number of idle cars.

The Senate small business committee staff has data indicating that cars are being hoarded at some points, particularly in the Great Lakes area, but Office of Defense Transportation officials say their reports clearly show there are no large supplies of idle empty cars.

The latest available figures show that 2,465,425 cars were loaded during the 46 weeks of this year up to November 16, as compared with 2,169,885 in the same period last year, an increase of 13.62 per cent and less than 1 per cent below the total loadings for 1946.

In loadings, tank cars showed a greater increase than total loadings of all commodities, but in turnaround, although there has been considerable improvement since last April. tank cars at 14.40 days compare unfavorably with all cars at 12.43 days. However, the October turnaround was 1.42 days shorter than that of April, and was far ahead of the 20.95 days turnaround of refrigerator cars which, like the tank cars, are privately owned and assigned to specific work.

Some administration officials believe the effectiveness of tank cars can be materially increased by return to the wartime policy of using tank trucks for longer hauls, and the ODT agrees that this would be desirable, but only on a voluntary basis.

The ODT has no intention of issuing any such order, realizing that there are many situations where trucks could not be used and many plants which are not equipped to handle truck deliveries. Mandatory use of trucks beyond their normal radius would involve the issuance of permits, too, and the ODT has neither funds nor staff for that work. During the war, when the truck order was in

effect, it was necessary to issue 40,000 permits in 1 month.

ODT officials believe that many tank cars could be released if the companies using them resorted to over-the-road hauling where it was feasible, but they also believe that the companies are the best judges of what can be done in that direction and look with deep disfavor upon all suggestions for mandatory action.

Order in Demand

SOME valuable byproducts may come out of the congressional studies of the foreign aid programs.

One of the striking features of the hearings that have been going on is the difficulty of getting a rounded picture of any situation, due to the splitting of authority among the many federal agencies.

For instance, Congress looks to the Oil and Gas Division for information on oil, and when a congressman or senator says "oil" he means all phases of it. But OGD officials cannot speak with authority on tank cars, which are in the province of the Office of Defense Transportation; on tankers, which are in the hands of the Maritime Commission, or on exports, which are controlled by the Department of Commerce.

They couldn't even say they would administer price control on oil, if it were granted and, in fact, seemed to think they wouldn't.

This situation doesn't exist only in oil. It is true of many activities in which government agencies are interested, and members of Congress are beginning to question whether it might not be advisable to bring a little order into the federal setup.

The first move in that direction is of interest to the oil industry. Bills have been introduced in both House and Senate to create a Department of Transportation with cabinet status, which would have over-all supervision of the railroads, air lines, water carriers and highway traffic.

A committee of five senators headed by Sen. Homer E. Capehart of Indiana is going into the proposal, and eventually there may be a secretary of transportation sitting in the cabinet chair that was warmed by the Secretary of the Navy before the Army-Navy merger.

Wherry and Rationing

THE hearings of the Senate small business committee have been prolix and have taken a great deal of the time of government officials and company representatives, but there is no gainsaying that they have accomplished something of benefit to fuel-oil consumers in many sections of the country.

Directly, they have resulted in dealing with some situations where distributors whose supplies had been cut off were facing the necessity of telling their customers they would have to go cold.

At the same time, they focused attention on a problem which some companies had shown a disposition to dodge—the protection of the unattached distributor who had no contractual arrangement with his suppliers.

Testimony during the hearings indicated there are a large number of independent distributors, large and small and at all levels between the refiner and the consumer, who normally bought supplies wherever they could make the best deals. But there also were many who bought from the same suppliers regularly, but refused to seek contracts because they feared they would lose some measure of their independence.

Since these distributors were classified as "spot buyers" some of the companies made no provision for them when they worked out allocations, while others considered them as "customers" equally with those who traded with them under contract. As a result, the distributors are getting as much as or more oil than they got last year from some companies, none whatever from others, but the net result is they are not getting enough, all told, to meet their customers' requirements.

That, in essence, is the burden of the complaints coming in to the committee, and it is on this point that it has been bearing down.

Sen. Kenneth S. Wherry of Nebraska, hammering at the point that if any distributors are allowed to go dry and home furnaces go cold as a result the administration may try to solve the problem by rationing, has succeeded in eliciting from the companies a promise to try to take care of all who bought from them last year.

This won't improve the over-all supply situation, but it will make for more equitable distribution, dampening any demand for rationing and quieting charges that were beginning to be made that some companies were using the shortage to eliminate independent competition.

Oil Taking Coal's Responsibilities, Unjustly Criticized, Wiess Says

HOUSTON.—The oil industry cannot continue indefinitely to take over from the coal industry the burden of supply of an increasing part of the nation's fuel requirements, and in the long run rising oil prices as a result of ever-heavier demand will reverse this trend.

This observation was made here December 4 by H. C. Wiess, president of Humble Oil & Refining Co., the nation's largest producing and purchasing company. Wiess traced the history of the nation's power sources since 1900 to show the shift from coal to petroleum usage, emphasizing the oil industry should not be misjudged for lack of adequate coal production.

Wiess, speaking at the twenty-seventh annual banquet of the Humble Club, an organization of company employes, said the actual shortage today of petroleum products is very slight and that we "can get through" if we be a little more prodigal in use. "The present shortage—whatever it is—is not chargeable to the industry," he continued.

"We do not know how much oil we can still produce or find in the future, but we do know we are not warranted in assuming we can continue indefinitely to provide a 5 or 10 per cent per annum increase."

As for synthetic oil sources, Wiess said it requires three times as much time, materials, and manpower to produce oil from natural gas as does conventional petroleum, and five to six times as much for the production of oil from coal. "This cannot be accomplished overnight," he added.

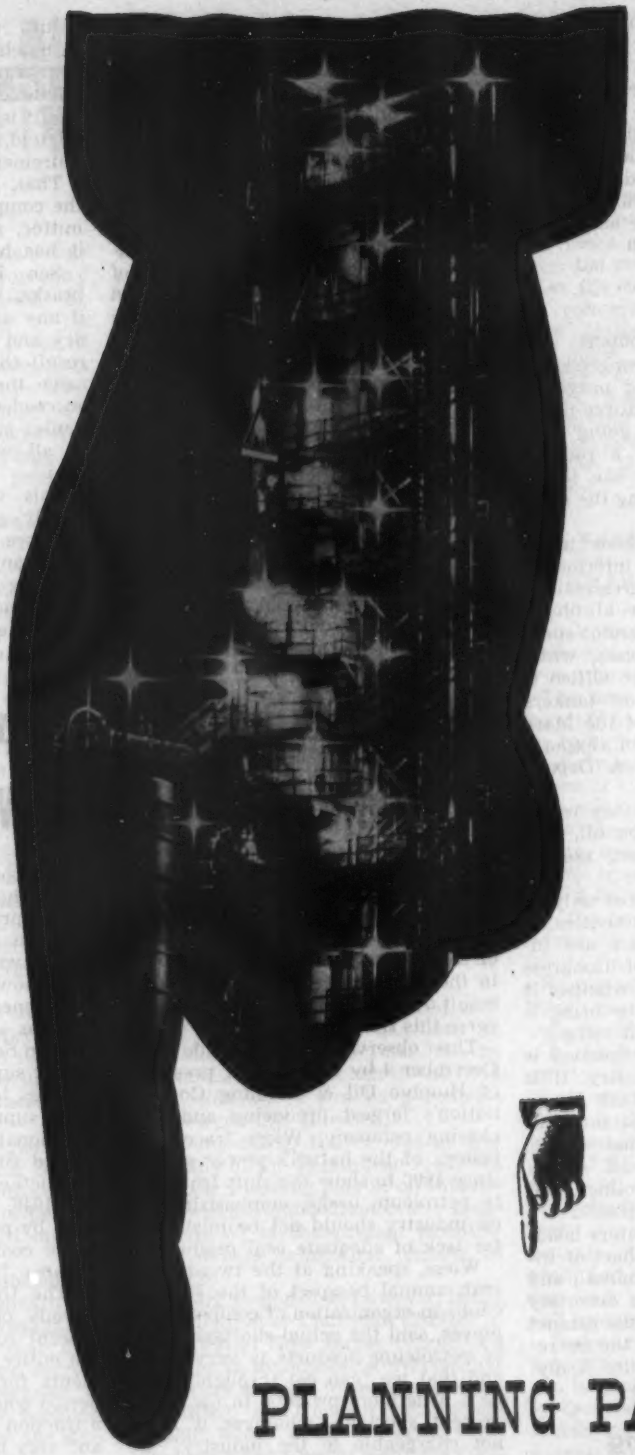
This present year, he said, has seen an even greater load on the oil industry with a recent government report showing oil now surpassing coal as an energy source.

Wiess also released a letter he had written Secretary of the Interior Krug on the supply situation.

Wiess told Krug that "oil and gas have supplied practically all of the additional energy produced in the United States since 1920 while coal production declined. Between 1941 and 1946, the shift to oil was encouraged by price controls on oil and gas, while coal prices were permitted to advance further.

"The United States oil industry is already operating at capacity under current conditions, and cannot carry the entire load of additional requirements for fuel, particularly in this period when Europe is producing only a fraction of its needs. It is high time and very important that all concerned realize this situation. When the facts are understood, I hope the industry will not longer be criticized or blamed for possible minor shortages if they occur. . . ."

In view of all the facts, Wiess said, the petroleum industry's record of performance does not justify or excuse any regimentation of government control, and the industry's achievements since the war show it is doing all possible to deliver maximum supplies to consumers.



PLANNING PAYS OFF

With today's market straining the industry's processing facilities to the limit, and an even greater market in store for 1948, refiners are going to be hard pressed ... unless their planning has been geared to meet demands.

Some refiners, for example those who now have or soon will have UOP Improved Fluid Catalytic Cracking Units in operation, are in an enviable position. The unit's ability to process a wide range of charge stocks in a number of ways means that these refiners will be able to keep pace with the market.

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UNIVERSAL SERVICE PROTECTS YOUR REFINERY

Col. T. H. Barton, chairman of the board, Lion Oil Co., El Dorado, Ark., addressed A.I.M.E. members and students at a banquet held in Sbisa Hall. Left to right here are Dr. H. H. Power, University of Texas; I. W. Alcorn, Pure Oil Co., Houston, chairman-elect of A.I.M.E.'s petroleum division; Prof. Albert B. Stevens, Texas A. & M. College, chairman of the program committee for the 2-day meeting; Henry Gruy, DeGolyer & MacNaughton, Dallas, toastmaster; Harold Decker, Pan American Petroleum Co., Houston, chairman of the Gulf Coast Section, which awarded the student prize; Col. Barton; Prof. Harold Vance, Texas A. & M. College; Dean F. C. Bolton, Texas A. & M. College; A. O. Hamon, president of the Petroleum Engineering Club at A. & M.; and Jack Crichton, DeGolyer & MacNaughton, Dallas, author of a paper presented at the meeting

Progress in Reservoir Engineering Emphasized in A.I.M.E. Meeting

by George Weber

COLLEGE STATION, Tex. — The important part played by the well-trained petroleum engineer in meeting current problems of a wide scope, and some new thought regarding trends in future reservoir studies highlighted the second annual All-Texas Section Meeting, A.I.M.E., held last week on the campus of Texas A. & M. College. A cooperative meeting of institute members in the industry, and educators and students from the state's two petroleum engineering colleges, the 2-day session comprised papers and discussions of a caliber which strengthened the annual event's reputation for excellence.

While a comprehensive range of engineering progress was covered in 16 papers read before the group, reservoir engineering came in for a predominant share of attention. The tenor of discussion of that subject was formed by recurring references to the expanding field of basic studies and the increasing importance of geological investigation to determine the definite effect of formation characteristics on flow of fluids through sand and limestone reservoirs.

Recognized by educators, this growing importance of geological training is reflected in the prominent share of geology in the petroleum engineering student's curriculum, providing the graduate with a better balance of geology, chemistry and physics required in studying reservoir performance. Students were encouraged by members to select their field in petroleum engineering and extend, if possible, their academic training either before or after entering practice.

In the opening session, Dr. C. R. Hocutt, Humble Oil & Refining Co.'s chief of production research, pointed to the war's impetus to research of all types. Progress was noted in the studies of drilling fluids, well cementing, and corrosion. In the province of reservoir behavior, where he stated production research has paid its richest dividends, he pointed to the fairly thorough understanding of the physical behavior and phase relations of hydrocarbon mixtures. As to the behavior of fluids in sands, the influences of capillary, gravitational and viscous forces are better understood than the influence of the characteristics of the solid matrix, he noted.

Progress Report

In a later paper, Dr. George H. Fancher and Leroy Puls of the University of Texas made a progress report on the latter's thesis work entitled "Some Capillary Pressure, Connate Water Saturation and Relative Permeability Relations," which incited considerable discussion. In this original work, still in progress, the water saturation of selected sand and limestone samples from several widely scattered domestic fields was compared with capillary pressure, and interesting data on the relationship of composition of the media to minimum water saturation was shown graphically. In the laboratory tests, care was taken to use either the natural formation water, when available, or water synthetically compounded to identical salinity with that found in the reservoir, another important point being stressed today as necessary in correctly evaluating cores in relative permeability studies.

A comprehensive report on drilling mud control in Southwest Texas by E. H. Lancaster, Jr. and M. E. Mitchell, Humble Oil & Refining Co., Corpus Christi, covered not only the types of muds and chemical additives, but the accepted techniques in mud treatment and control as employed in that active area. A thorough analysis of the economic value, limitations and employment of lime treated muds was included—an important contribution to the practical knowledge of that type of mud from an area where its use is finding increased favor.

Of interest not only to engineers but geologists and management was the report on diamond drilling in West Texas and the first evaluation of an Ellenburger dolomite core so recovered, given jointly by Burton Atkinson and David Johnston, also of Humble, Midland. The latter author reported on the mechanical phase of diamond work, concluding that while progress in design of bits in inner core barrels has been made and will continue, diamond coring in the fractured pre-Permian dolomite of the area is still expensive, although it may be justified in some cases by the geological information it affords.

Atkinson described the diamond bit as the only tool to date which will give a high core recovery in the Ellenburger formation of West Texas, citing recoveries of 92 per cent and 99 per cent as compared with the average of 50 per cent by conventional coring. The importance of recovering Ellenburger cores intact lies in the need for measuring the fracture porosity, an impossibility when the core is broken up along fracture surfaces as is the case with regular cores.

The winner of the student paper contest, J. L. Hargrove, of the University of Texas, was given the annual award of the Gulf Coast Section for his paper entitled "Interpretations and Uses of Gamma Ray and Neutron Logging." Total attendance at the meeting approached 300 of which about 130 comprised students from the two schools. *(For a complete list of papers and authors, see The Oil and Gas Journal, November 29, page 56).*

400 Exhibitors Demonstrate Latest In Processes and Equipment

by Arch L. Foster

NEW YORK.—With more than 400 exhibitors, the twenty-first Chemical Exposition at the Grand Central Palace here was host last week to the largest assembly of chemists and chemical manufacturers ever to gather in America.

Exhibits at the show ran the entire gamut of raw materials, from which chemicals are made; intermediates or partly processed materials for the same purposes; catalysts and catalyst-building products for every conceivable type of reaction promotion; mixers, reactors, agitators, separators; heaters, coolers, condensers, entire processes; control and recording instruments of every sort, electronic, mechanical, electrical in which fields such outstanding advances have been made in recent years.

Important achievements were shown in catalysts and catalysis; piping, condensers, coolers, and other media for handling corrosive materials; pumps and material handling, along with filters and clarifiers; control instruments; mixers and blenders; and thickness gaging units, to which much attention is being given now.

One of the most interesting of the newer developments shown was the Electroflux thickness gage. Based on the principle of the flow of an electric current between two electrodes as affected by the distance and the thickness of the metal, this instrument measures wall thickness from one side of any metal surface on which contact can be made. Nonmetallic contents of the vessel have no effect on the accuracy or dependability of the value obtained, it was said. The metal thickness value is obtained, according to the claim of its inventor, to an accuracy of 3 per cent of the actual thickness. Metal ranging from ⅛ in. to 2¼ in. in thickness can be measured, and this can be extended by special equipment, it is understood. The machine operates from any 110-115 volt 50 or 60-cycle current source.

Catalyst development progress was typified by the Davison oxidation catalyst, to oxidize naphthalene to phthalic anhydride, and potentially applicable to numerous hydrocarbon oxidation reactions.

Among many chemicals, new and not yet old, of interest to the oil industry are the (Koppers) cresols, as extraction solvents; chlorobenzenes for use in lubricant additives; substituted cresols such as di-tertiary-butyl-p-cresol, used as an anti-oxidant, as lubricating oil additive and gasoline gum stabilizer.

Duradiant burners, built mainly of special refractories and suited for firing furnaces with gas for petroleum and chemical plants, were shown, including a more recent development in that line; use of these very short flame burners is said to simplify furnace design and reduce costs.

Among innumerable other interesting items were the Sarco thermostatic steam trap for improving temperature controls on steam heating; photoelectric combustion controls for oil fuels; electronic controls for gas flame heating; ion exchange boiler and process feed water systems of both series and parallel methods for dissolved solids removal and pH control; the new Cornell homogenizers and versators for liquids blending; a-c remote indicating and control systems, and a long list of products important to all phases of the chemical and petroleum industries.

Porter Again to Head Mid-Continent Association

FRANK M. PORTER, owner of Fain-Porter Drilling Co., Oklahoma City, was reelected president of the Mid-Continent Oil and Gas Association at the annual meeting of association directors in Tulsa, December 3.

FRANK M. PORTER

R. B. Anderson, of the Waggoner Estate, Vernon, Tex., was elected vice president for Texas. Anderson recently was elected president of the Texas Mid-Continent Oil and Gas Association.

All other officers were reelected. They are: Jake L. Hamon, Cox & Hamon, Dallas, first vice president; E. F. Bullard, Stanolind Oil & Gas Co., Tulsa, vice president for Oklahoma; H. E. Zoller, Derby Oil Co., Wichita, vice president for Kansas; A. W. Weyland, Arkansas-Louisiana Gas Co., Shreveport, vice president for Arkansas and Louisiana; W. M. Vaughey, Vaughey & Vaughey, Jackson, vice president for Mississippi and Alabama; and Van C. Welch, of Flynn, Welch & Yates, Artesia, vice president for New Mexico. Clarel B. Mapes was reelected general secretary and treasurer.

This will be Porter's second term as president. He is just completing his fourth term as president of the Kansas-Oklahoma Division. A 30-year veteran of the industry, he began in 1916 with Dundee Petroleum Co. He organized, with the late Leslie Fain, his present company in 1939.

Opposition Expected to East Coast Morrill Plan

NEW YORK.—Strong industry opposition is expected to the five-point East Coast program which would freeze relationships between primary and secondary suppliers and which would provide for the organization of a refining committee that would "determine yields best calculated to meet recognized demand in all products."

This is part of a plan suggested December 4 by the Atlantic Coast Oil Conference and submitted to Interior Secretary Krug in a letter from the conference's executive director, Clyde Morrill.

The Morrill plan is the first such inclusive proposal since Deep Rock Oil Corp.'s vice president, B. L. Majewski, presented, then withdrew, his controversial program from the National Petroleum Council for concerted oil-industry action east of the Rockies.

In Morrill's letter to Krug, he suggested that the secretary ask major oil companies to submit a review of whatever legal assistance—clearance from the Justice Department—would be needed to put such a program into effect. Relief from the threatened East Coast oil shortage this winter is of course the basis on which the Atlantic Coast Oil Conference has acted.

The projected program also envisions organization of special industry committees on transportation and marketing.

PERSONALS

Bloemgarten Veteran Of Shell Organization

H BLOEMGARTEN, who on January 1 will become managing director in charge of technical operations of the Royal Dutch-Shell companies, is a 54-year-old industry veteran with 27 years of service with the Shell organization.

Born in Holland November 3, 1893, Bloemgarten was graduated from Delft University in 1920.

That year he joined N. V. de Bataafsche Petroleum Maatschappij (B. P.M.), one of the three principal operating companies of the Royal Dutch-Shell organization, as an exploitation engineer. He remained at The Hague in this capacity until 1929, when he was appointed assistant production manager.

He became vice president in charge of production of Shell Petroleum Corp., St. Louis, in 1935, and in 1938 was named vice president in charge of production for Shell on the West Coast.

From 1939 until 1941 he carried out various assignments for the Royal Dutch group in Europe and South America, and in 1942 was appointed advisor to Shell's president in New York on exploration and production matters.

Since 1943 he has been vice president in charge of exploration and production of Shell Oil Co., Inc., with headquarters in New York.

His headquarters in his new post again will be The Hague.

Leslie M. Wilshire has been named district geologist for eastern Oklahoma for Skelly Oil Co. in Oklahoma City. **Palmer Kise** will be assistant to Wilshire.

I. B. Hamilton, paleontologist in the Dallas office for Sun Oil Co., has been moved to the Midland district geological office.

G. E. Sweeney, formerly division production superintendent for Sun Oil Co. in the Permian basin, has been promoted and transferred to the Dallas headquarters of the company. **J. B. Hamilton,** formerly production superintendent for the company's Louisiana-Mississippi division, has been named to succeed Sweeney at the Midland office.

Fladger F. Tannery, assistant controller of Humble Oil & Refining Co., Houston; **Sidney J. Stacey,** controller of California Texas Oil Co., Ltd., New York; **James L. Polk,** secretary and treasurer of Atlas Oil & Refining Corp., Shreveport, and **Eugene A. Wurster,** assistant controller of Socony-Vacuum Oil Co., Inc., New York, have been elected to membership in the Controllers Institute of America.

S. B. Fowler, formerly with Stanolind Oil Purchasing Co. in Midland, Tex., will be representative and crude-oil buyer for a new company, Wood River Oil & Refining Co., which is currently buying oil in the Permian basin.

Ellsworth M. Curry, seismologist for Shell Oil Co., Inc., in Washington, has been transferred to Sacramento, Calif. Other transfers in the exploration department include: **Albert C. Eckerle,** seismograph operator, Washington to Sacramento; **Roy Farnsworth,** junior seismologist, Los Angeles to Casper, Wyo.; **Clifford Jarman,** junior seismologist, and **Frank Anderson,** seismograph operator, Washington to Sacramento; and **Charles I. Warren,** in the land department, has been promoted to assistant land manager in the Los Angeles office.

F. E. Caddy, plant superintendent in Shell Chemical Corp. at Torrance, Calif., has been promoted to senior technologist in the head office. Other promotions in the company include: **M. J. Douglas,** assistant maintenance foreman at Shell Point; to maintenance foreman; **F. J. Haverschmidt,** department manager at Torrance, to senior technologist in the head office; **G. F. Saunderson,** junior engineer at Dominguez, to engineer; **L. F. Warner,** junior chemist at Dominguez, to chemist. In Shell Development Co. **Robert E. Vincent,** junior engineer, has been transferred from Wilmington to San Francisco.

William Lane, assistant manager in the foreign trade department of Standard Oil Co. of California, has been in New York recently on business. San Francisco is his headquarters.

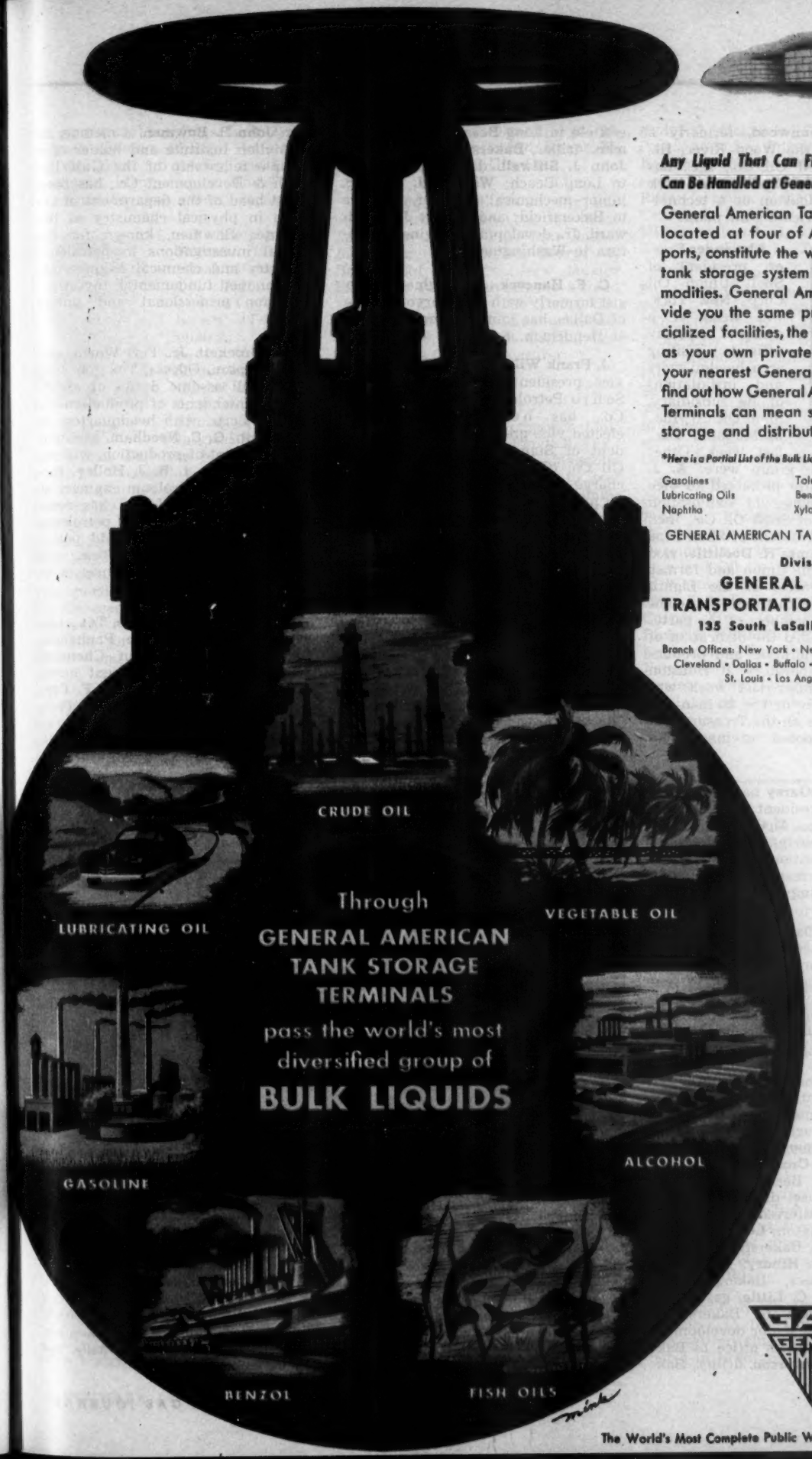
George A. Hill, Jr., president of Houston Oil Co. of Texas; **Ralph Neuhaus,** vice president and general manager, Hughes Tool Co.; **John C. Flanagan,** executive vice president and general manager, United Gas Corp.; **George R. Brown,** vice president, Brown & Root; and **Charles F. Reed,** manager of the Houston office, Dow Chemical Co., are among the 15 new directors named to the board of the Houston Chamber of Commerce.

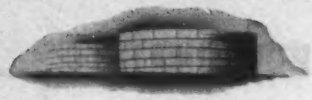
Dr. Arthur B. Hersberger, divisional director of the research and development department for Atlantic Refining Co., has been appointed manager of the recently organized chemical products division for the company. The new division will coordinate work in the fields of chemical research, chemical manufacturing, and chemical sales. Hersberger has been with Atlantic since 1936 when he joined the company as assistant chemist after graduating from the University of Maryland with a Ph.D. degree in chemistry.

Philip R. Crippen, Apex Motor Fuel Co., has been elected the new president of Chicago Oil Men's Club. Other officers elected included: **Gerald J. LePine,** Trans-American Petroleum Corp., first vice president; **John Stumpf,** Johnson Oil Refining Co., second vice president; **J. T. McDowell,** Cities Service Oil Co., treasurer; and **Truman H. Gish,** Consumers Co., secretary. New directors elected were: **Marvin W. Prellberg,** American Mexican Petroleum Co.; **W. H. Ganley,** Falley Petroleum Co.; and **J. S. Van Pelt,** Berry Asphalt Co.

Fred E. Hummel, formerly metallurgical engineer for Shell Oil Co., Inc., has gone into the consulting field to specialize in chemical control of drilling fluids. He has set up his office in Ojai, Calif.

George W. Robey, former Coleman County, Texas, sheriff, has been added to the staff of the Texas Mid-Continent Oil and Gas Association as a part of the association's campaign against theft of oil-company supplies and equipment.





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****Here is a Partial List of the Bulk Liquids Handled at General American***

Gasolines	Toluol	Coconut Oil
Lubricating Oils	Benzol	Fish Oil
Naphtha	Xylol	Cotton Seed Oil

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PERSONALS

Fred H. Grennwood, formerly a technologist in the Wood River, Ill., refinery of Shell Oil Co., Inc., has joined the staff of Shell's Deer Park refinery near Houston as a technologist in the lubricating-oil plant.

A. FRASER

Alexander Fraser, president of Shell Union Oil Corp., New York, was head of a group of company officials visiting area headquarters and installations of its subsidiary, Shell Oil Co., Inc., in Midland, Tex., last week. Other members in the group were: **A. J. Galloway,** recently promoted to vice president in charge of exploration and production of Shell Oil Co., Inc.; **T. E. Swigart,** president of Shell Pipe Line Co.; and **James H. Doolittle,** vice president of Shell Union and former commanding general of the Eighth Air Force. Four directors of the company were also members of the party. The group attended the dedication of Shell's new exploration and production research laboratory at Houston December 5. Fraser last week was named a member of the 20-man advisory committee on the Treasury Department's proposed savings bond drive.

Thomas F. McGarey has been elected senior vice president and a director of Petrol Corp. McGarey is well known in oil circles, having served in executive positions with both independent and major oil companies in the East during the past 18 years.

John E. Gallagher, development engineer at Bakersfield, Calif., in the production department for Shell Oil Co., Inc., has been promoted to senior mechanical engineer. Other promotions in the production department include **Robert J. Sutton,** engineer at Dominguez, to operator in charge and **Leo L. Sargent,** driller at Ventura, to drilling foreman. Transfers in the same department include: **Ralph E. Ashbaugh,** drilling foreman, Bakersfield to Long Beach; **Walter M. Cheney,** drilling foreman, Ventura to Long Beach; **Eldo B. Croson,** driller, Bakersfield to Long Beach.

Joseph L. Cruse, drilling foreman, has been transferred from Long Beach to Washington; **Lee A. Ebaugh,** drilling foreman, Bakersfield, to Ventura; **Horace W. Hindry,** senior mechanical engineer, Bakersfield to Ventura; **Weare C. Little,** gas-testing engineer, Oilfields to Bakersfield; **Donald S. Nutter,** senior development engineer, Los Angeles office to Bakersfield; **James Peterson,** driller, Bakersfield to Long Beach; **Emil A. Ritzman,** driller, Bakersfield to Ventura; **John J. Stilwell,** driller, Bakersfield to Long Beach; **William J. Wagner,** junior mechanical engineer, Ventura to Bakersfield; **and Robert J. Woodward, Jr.,** development engineer, Ventura to Washington.

C. F. Hancock, Jr., engineer-geologist formerly with Tex Harvey Oil Co. of Dallas, has joined **George S. Engle** at Henderson, Ky.

J. Frank Wilson, vice president of Sohio Petroleum Co., has been elected vice president of Standard Oil Co. (Ohio) in charge of crude-oil purchasing. He began his career in 1920 when he joined Great Southern Refining Co. in Kentucky working in the crude-oil procurement field. He later worked as engineer with the M. W. Kellogg Co. in refinery construction work and then joined Producers Pipeline Co. Besides his new position Wilson is also president of Ohio River Pipe Line Co.; vice president of Owensboro-Ashland Co.; vice president of Columbia Pipe Line Co.; vice president of Sohio Pipe Line Co.; and director of Atlas Oil & Refining Corp. His headquarters will continue to be in St. Louis.

Dr. John R. Bowman, a member of the Mellon Institute and holder of a multiple fellowship of the Gulf Research & Development Co., has been named head of the department of research in physical chemistry at the Institute. Bowman, known for his original investigations in petroleum chemistry and chemical engineering, will conduct fundamental investigations for professional and public benefit.

E. D. Brockett, Jr., Fort Worth, and **N. C. Simpson,** Odessa, Tex., on January 1 will assume duties of assistant superintendents of production for Gulf Oil Corp., with headquarters in Fort Worth. **O. C. Needham,** assistant superintendent of production, will retire next March 1. **R. J. Holley,** formerly assistant petroleum engineer at Odessa for Gulf's West Texas zone, will become assistant chief petroleum engineer. **C. B. Hussey,** field petroleum engineer at Kermit, Tex., will become zone petroleum engineer, with headquarters at Odessa.

E. M. Frost, Jr., Amarillo, Tex., was elected president of the Panhandle Plains section, American Chemical Society, for 1948, at a recent meeting in Amarillo. **Dr. Charles F. Fryling,** rubber research division, Phillips Petroleum Co., was named chairman-elect; **E. G. Hammerschmidt,** chief chemist, Texoma Natural Gas Co., Fritch, Tex., was selected as councilor to represent the local sec-

Niven M. Baird, center, front row, of American Republics Corp., was elected president of the New Mexico Oil and Gas Association at the group's annual meeting in Artesia, N. M., December 3. He succeeds Van S. Welch, of Flynn, Welch & Yates. Members unanimously reelected the executive committee, composed of Baird, Welch, Emery Carper of Carper Drilling Co.; Harry Leonard, Leonard Oil Co.; D. D. Bodie, Cities Service Oil Co.; R. L. Hendrickson, Stanolind Oil & Gas Co.; J. N. Dunlavey, Skelly Oil Co.; and John M. Kelly and F. J. Danglade, independent producers. Carper was reelected vice president and Leonard, treasurer. Arthur R. McQuiddy was reelected executive secretary. In the above photo are, seated, Leonard, Baird, and Welch, and, standing, McQuiddy, Hendrickson, Kelly, and Jack Campbell, attorney for the association

tion at national meetings. **L. A. Bliss,** research chemist, Phillips Petroleum Co., was elected treasurer, and **L. O. Thompson,** plant chemist, The Texas Co., Amarillo, was named secretary.

J. A. HOLMES

Joseph A. Holmes, International Petroleum Co., Ltd., representative, has been elected chairman of the newly formed Venezuelan section of the American Institute of Mining and Metallurgical Engineers at Caracas. **Dr. Jose Martorano,** director of Venezuela's petroleum bureau, was named first vice chairman. Prior to his graduation from the University of Tulsa he was for many years technical petroleum inspector with jurisdiction in several states of Venezuela. **J. A. Poulin,** executive vice president, United Geophysical Co., Caracas, was elected second vice chairman. Poulin was formerly chief geologist for The Texas Co. **F. H. Storms** and **Arnold E. Parr** were elected secretary-treasurer and assistant secretary-treasurer respectively. **Dr. Santiago Vera,** president of the Central University of Caracas and a graduate of the University of Oklahoma, was elected to the board of councilors. Other board members chosen were **John F. Dodge,** vice president and manager of Pantepec Oil Co. of Venezuela C.A.; **Dr. Siro Vasquez,** an executive of Creole Petroleum Corp. and a graduate of the University of Tulsa; **Dr. L. Herrera,** of Mene Grande Oil Co. and graduate of the University of Texas; and **L. W. Storms** of Creole Petroleum Corp. More than 150 names, including members, junior members and associate members, have been submitted to the Venezuelan Government for legalization of the group.

John E. Mabee, Midland, Tex., oil operator and rancher in Texas and Oklahoma, has been named to Oklahoma's Hall of Fame. He is the first person to receive that honor living outside the state. He was acclaimed for his $500,000 gift to the University of Tulsa and as the largest buyer of war bonds in the state. He purchased $1,000,000 in war bonds each drive.

D. T. Ring, president of the Pennsylvania Grade Crude Oil Association, was one of the speakers at the fiftieth anniversary of the West Virginia Geological and Economic Survey. Other speakers on the program included: **Irvin Stewart,** executive officer, Geological Survey Commission; **Paul H. Price,** state geologist; and **Joseph M. Low,** Hope Natural Gas Co.

A. D. Rogers, Shell Oil Co., Inc., has been elected president of the West Texas-New Mexico Pipe Line Scouts Association. He succeeds **George W. Herring,** of the Texas-New Mexico Pipe Line Co. Other officers elected were: **W. E. Bates,** The Texas Co., vice president; **M. G. Langhorne,** secretary-editor; and **M. R. Griffin,** Sinclair Prairie Oil Co., treasurer.

SHIFTS—

Donald W. Jackson, engineer, Gulf Oil Corp., Goldsmith to Penwell, Tex.; **W. R. Donnell,** geologist, Magnolia Petroleum Co., Midland, Tex., to Roswell, N. M.; **Francis F. Hebert,** engineer, Humble Oil & Refining Co., Crowley to Pointe a la Hache, La.; **T. G. Jacks,** foreman, The Atlantic Refining Co., Franklin, La., to Corpus Christi, Tex.; **E. V. Hodge,** superintendent, Warren Petroleum Corp., Graham, Okla., to Salem, Ill.; **Milton E. Fox,** engineer, Carter Oil Co., Tulsa, to Elmo, Ill.

J. Kenneth Myers, engineer, Union Oil Co. of California, Los Angeles to Torrance, Calif.; **William D. Lewis,** geologist, General Petroleum Corp., Pasadena to Los Angeles, Calif.; **Steve Redmond,** engineer, Magnet Cove Barium, Riviera to Edinburg, Tex.; **J. J. Pitts,** foreman, Robert H. Ray Co., Conroe to Bay City, Tex.; **Floyd H. Miller,** geologist, Gulf Oil Corp., Fort Worth to Amarillo, Tex.

J. C. Stansbury, engineer, Phillips Petroleum Co., Goldsmith to Odessa, Tex.; **J. O. Laws,** foreman, Amerada Petroleum Corp., Lamar, Colo., to Scott City, Kans.; **G. A. Gresham,** superintendent, Helmerich & Payne, Inc., Ulysses, to Garden City, Kans.; **R. A. Lewis,** superintendent, Rocky Mountain Drilling Co., Everett, Wash., to Bakersfield, Calif.; **Wesley K. Rickel,** engineer, Amerada Petroleum Corp., Oraibi, Ariz., to Roswell, N. M.

Oliver R. Young, foreman, Pure Oil Co., Abilene to Sweetwater, Tex.; **Fred L. Thompson, Jr.,** engineer, Humble Oil & Refining Co., Tyler to Overton, Tex.; **Verne Zaura,** engineer, Standard Oil Co. (Ind.), Chicago, Ill., to Whiting, Ind.; **Paul Sieman,** geologist, Tide Water Associated Oil Co., Casper, Wyo., to Bakersfield, Calif.; **Richard Williams,** geologist, Seismic Engineering Co., Rawlins, Wyo., to Palestine, Tex.; **Joe Tracy Williams,** foreman, The Carter Oil Co., Woodward, Okla., to Rock Springs, Wyo.

DEATHS

Rogers Lacy, 63, widely known Texas oil operator, died December 9 of a heart attack at his home in Longview, Tex. Born in Longview in 1884, Lacy entered the oil industry through ownership of a 26-acre tract in what, in 1931, became East Texas field. He left an estate estimated at $45,000,000.

Ernest J. Shaffer, 51, independent oil operator, died December 3 in Dallas. Shaffer, one of the founders of the Shaffer Specialty Co., invented the four-in-one sucker rod socket. He was at one time district superintendent of production for the Empire Gas & Fuel Co. at Eldorado, Kans., and later became prominent as an oil producer in Wichita and Hutchinson, Kans.

Horace M. Staggs, a partner in the recently formed drilling-contracting company of Staggs & Tullos, of Odessa, Tex., died December 4 in Dallas. Staggs had served with Atlantic Refining Co. as petroleum engineer and later as head of the operations department, until this year when he established the Odessa firm.

W. R. Settles, 89, pioneer West Texas oil operator and rancher, died December 5 in Big Spring, Tex.

Robert C. Wickersham, 52, an executive of Koppers Co., Inc., died November 28 in Pittsburgh. He was vice president and assistant general manager of Koppers Tar Products Division.

Alfred Kimball Barnes, 66, former attorney for Mid-West Refining Co., died November 29 in Denver. He served Mid-West in Casper, Wyo., and in Denver until the company was dissolved in 1931.

Vernon S. Owens, 52, who retired in 1944 as general manager of Forest Oil Corp. after serving more than 28 years, died December 2 in Olean, N. Y.

W. G. Sole, 46, former superintendent for Maguire Industries in western Kansas and Texas and prior to that superintendent of production for Solar Oil Corp., Wichita, died recently in Bristow, Okla.

Daniel E. Nolan, 59, independent oil producer in the Bradford, Pa., area and retired since 1935, died December 5 in Bradford.

New Gasoline Plant . . .

Stanolind Oil & Gas Co.-HASTINGS, TEX.

The wet gas is gathered from 660 wells via 35 miles of lines to 160 tank batteries and separators—it goes to absorbers at 700 psi.—plus final boosting to sales outlets and also to 5,000 psi. (if necessary) to gas injection for underground storage. Liquid products: 46,000 gal. per day.

by Ed Short

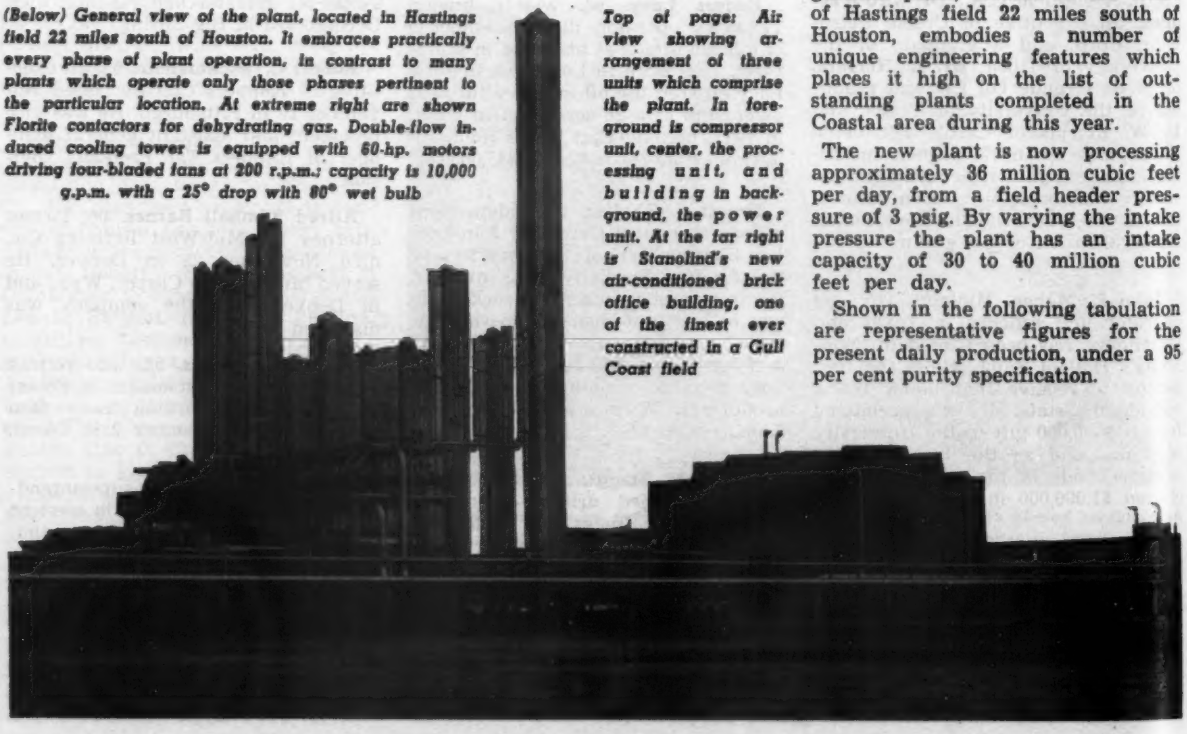
DESIGN of Stanolind Oil & Gas Co.'s most recently completed gasoline plant, located in the heart of Hastings field 22 miles south of Houston, embodies a number of unique engineering features which places it high on the list of outstanding plants completed in the Coastal area during this year.

The new plant is now processing approximately 36 million cubic feet per day, from a field header pressure of 3 psig. By varying the intake pressure the plant has an intake capacity of 30 to 40 million cubic feet per day.

Shown in the following tabulation are representative figures for the present daily production, under a 95 per cent purity specification.

(Below) General view of the plant, located in Hastings field 22 miles south of Houston. It embraces practically every phase of plant operation, in contrast to many plants which operate only those phases pertinent to the particular location. At extreme right are shown Florite contactors for dehydrating gas. Double-flow induced cooling tower is equipped with 60-hp. motors driving four-bladed fans at 200 r.p.m.; capacity is 10,000 g.p.m. with a 25° drop with 80° wet bulb

Top of page: Air view showing arrangement of three units which comprise the plant. In foreground is compressor unit, center, the processing unit, and building in background, the power unit. At the far right is Stanolind's new air-conditioned brick office building, one of the finest ever constructed in a Gulf Coast field



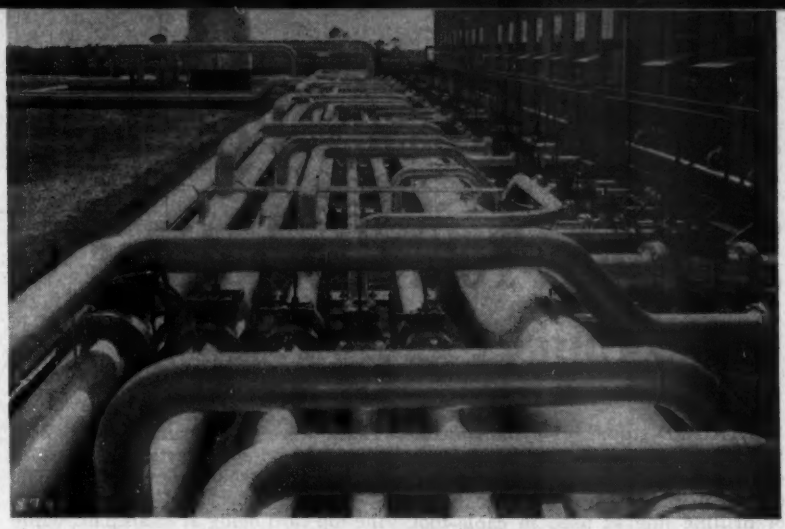
	Gallons per day	Extraction g.p.m.
Natural gasoline (12½-lb. R.v.p.)	23,113	.639
Butane	12,996	.361
Propane	10,110	.281
Total	46,219	1.281

Source of Gas—Hastings Field

Hastings field is located on a deep-seated nonpiercement-type salt dome. The discovery well was completed in May 1935. Production is from the Marginulina-Frio sands of the Oligocene formation. Subsequent drilling to the upper Frio and lower sand sections resulted in the completion of twin wells. Hastings field has 5,500 productive acres of which Stanolind owns 74 per cent.

Gas now being processed by Stanolind's gasoline plant is coming from a total of 660 wells in the field, which produce approximately 60,000 bbl. of oil per day from depths varying between 5,000 and 6,100 ft. Sand thicknesses vary between 100 and 375 ft. Approximately 95 per cent of the wells flow naturally through 2 or 2½-in. tubing with well-head tubing pressures between 500 and 600 psi. The remaining 5 per cent of the wells are on gas lift.

There are 160 separate tank batteries in the field from which gas is collected and metered. The field gathering system consists of 35 miles of pipe lines varying in size from 2 to 16 in. in diameter. The outermost tank battery in the gas-gathering system is approximately 2 miles from the plant. Separator pressures at each tank battery are maintained by regulators at atmosphere, or a few pounds above.



View of compressor building and wet-gas suction and discharge lines. Gas is compressed to 700 psig., which is plant absorption pressure

The Hastings plant takes gas at pressures varying from 10 psig. to 10 in. vacuum and five-stages it to approximately 3,500 psig. The final discharge pressure can range up to 5,000 psig. if required for gas injection into a gas-storage well. Compressor equipment consists of nine three-stage 1,000-hp. 300-r.p.m. Cooper-Bessemer V-type units and three two-stage 800-hp., 300-r.p.m. Cooper-Bessemer units. The gas volume from the tank batteries may vary, due to the difference in temperature between day and night, by as much as 1 to 3 million cubic feet. In addition to this, another variable is introduced by having a gas lift system in the field to supply with residue gas, which requires a fluctuating volume of between 6 and 9 million cubic feet per day. This gas is taken off as required at the third-stage discharge at 700 psi., or the fourth-stage discharge at approximately 1,600 psi. The compressors were arranged to handle this

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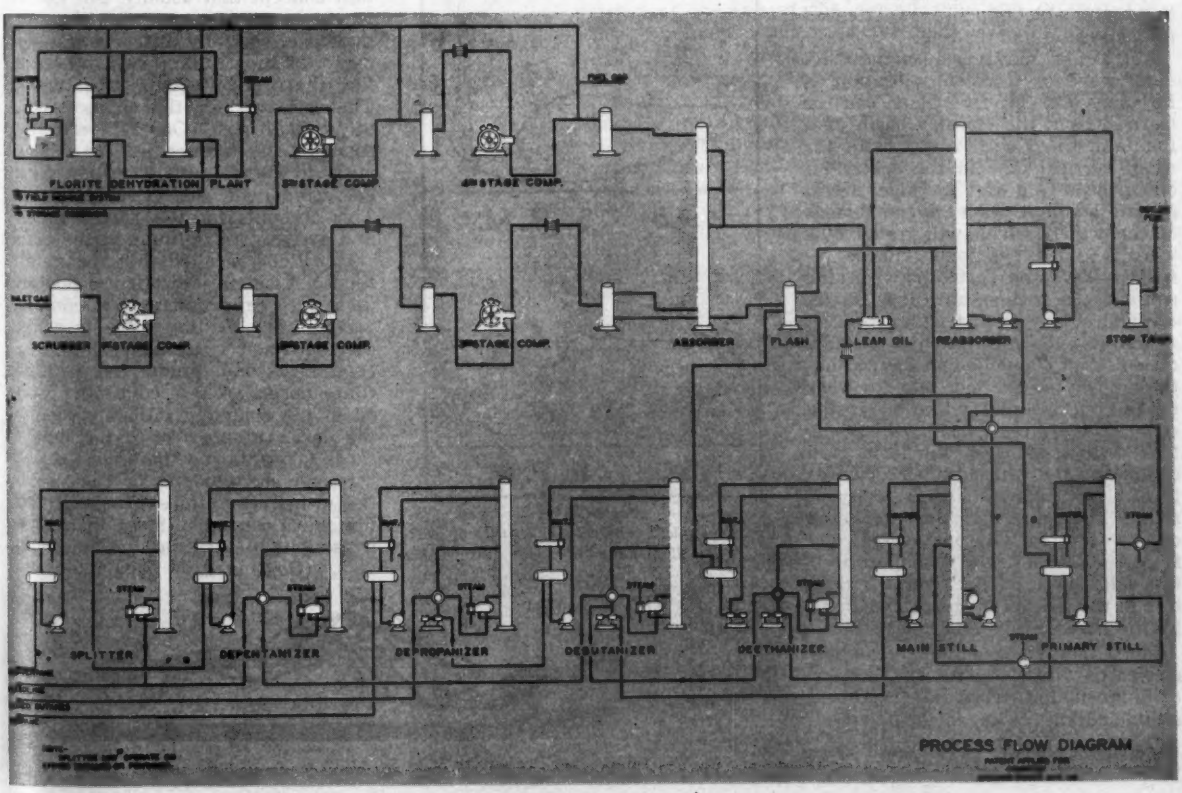
Chart of new Hastings plant showing the gas-handling steps and the processing flow, the major equipment, and the products



Drilling Stresses Present In Cable-Tool Operations

by John F. Kendrick*

DETAILED studies of dynamometer cards have shed additional light on the characteristics and occurrence of the drilling stresses in the cable or drilling line as used in cable-tool or spudder drilling operations. The principal stresses are caused by:

1. A complex transient vibration, which is reflected back and forth, between the clamp and rope socket.
2. A localized kinking or dog-legging of the cable, resulting from an untwisted condition associated witn the natural vibration of the drilling cable.
3. Excessive inertia resulting from too high or tight a hitch.

It is the purpose of this article to consider the rig and operating conditions that cause the complex transient vibrations, to identify the factors that are frequently controllable to localize and minimize them, and to speculate on possible future changes in rig and drilling methods, which may further localize, minimize, and possibly eliminate the stresses responsible, in a large measure, for the high cable expense experienced in deep cable-tool drilling.

The reader may visualize the traveling wave or transient vibration, if he considers briefly what can be learned from the circular basin of a fountain, filled with water, with the usual vertical pipe in the center. If one drops a ring over the pipe, it will initiate a simple wave, in the surface of the water, which will travel outwardly to the rim, and will be reflected back and forth, between the rim and center pipe, until it is finally damped out by fluid friction.

Anyone who has watched a string of tools being spudded in knows that the impact of the bit sets up very intense and complex vibrations in the stem. These are transferred to the taut drilling cable in the form of a complex wave which travels upwardly to the clamp with the velocity of sound in steel. It is then reflected downwardly to the rope socket, and is reflected back and forth, until it is finally damped out by the reduction in the tension of the cable caused by the reversal of the stroke.

Fig. 1 is a series of four dynamometer cards which are typical of a good drilling motion when an unspliced steel drilling cable is being used. These were taken successively, with all factors kept practically constant except the strokes per minute. The speed was increased progressively, the top card being at 38.5 s.p.m., while the bottom card was taken at 50 s.p.m.

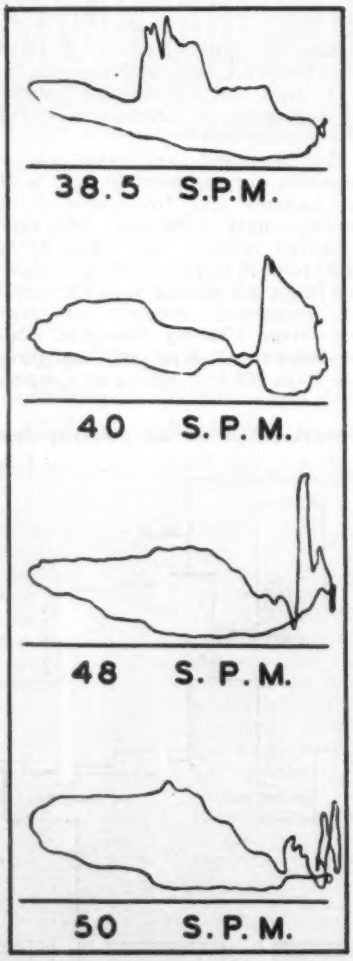


Fig. 1—Typical dynamometer cards of reactions in drilling cable in upper elastic zone

The unspliced ⅞-in. drilling cable was about 2,900 ft. from clamp to swivel rope socket. The peak, occurring at different points on the upstroke line of the different cards, is caused by the traveling wave or transient vibration.

Other typical dynamometer-card characteristics of such drilling conditions are the smooth nose and the excessive magnitude and jagged profile of the peak. Considerable difficulty was experienced in rationalizing these and other peculiarities of a long series of such cards, taken both in Michigan and West Virginia.

The dynamometer card reproduced in Fig. 2 was taken by the Star recorder, made by The Star Drilling Machine Co. This is an interesting instrument. A hydraulic pickup of the diaphragm type is used. The cards are drawn on adding-machine tape, and after a card has been retraced a prescribed number of times, the tape is rolled to a new position by a system of cams. This cycle is repeated automatically, so that an enormous number of cards is obtained with relatively little effort. Fig. 2 shows a secondary peak about midway between the main peak and the left end of the card. This secondary peak was apparent in very few of the large number of cards made with the Star instrument.

Interpretation of Dynamometer Cards

The few dynamometer cards of the type shown in Fig. 2 called attention to the reflected-wave basis of interpretation, and added the very important concept that usually, but not always, the traveling wave is the summation of so many different frequencies that they nullify each other before the first reflection at the clamp. This accounts for the characteristically smooth nose. On each reflection, some of the frequencies are filtered out, and the magnitude of the reflected component generally increased. This accounts for the jagged profile and excessive magnitude of the peak.

It will be recalled that the amplitude of a simple vibration is doubled upon each reflection. As the complex wave in the drilling cable is generally reflected twice before it is recorded, its magnitude can be four times normal. These concepts resulted in the complete rationalization of the large number of dynamometer cards taken during this investigation.

It will be evident to the reader that when conditions are such that this wave can make more than three trips along the drilling line, the dyna-

(Continued on page 106)

Fig. 2—Dynamometer card, suppressed intermediary peak

*Consulting engineer, 16 East Broad Street, Columbus 15, Ohio.

Gravel-Packing Technique At Huntington Beach Has Unique Features

by Herndon David

A UNIQUE completion recently adapted in Huntington Beach field, Orange County, California, has made possible commercial production from a shallow Tar zone and has greatly increased the recoverable reserves in the field. Employing a method known as circulated gravel packing, operators in the field are now able to gravel pack two productive zones and effect a water shutoff in a single operation.

The Tar zone at Huntington Beach, found at depths of approximately 1,800 to 2,000 ft., was the first zone consolidated, but the sand was loosely consolidated and commercial production soon became impossible due to excessive skimming and bailing operations required. It was found, however, that gravel packing, if effectively applied, would serve as a filter area and permit production of from 40 to 75 bbl. per well per day from the zone.

Until recently gravel packing was hampered by the stratigraphy of the formation. Known as the Bolsa Tar zone, the formation consists of two productive sands with an intermediate shale ranging in thickness from 50 to 75 ft. Midway in the shale is an extremely prolific water sand 10 or 12 in. thick, and ordinary gravel-packing methods would not permit packing of the productive zones after an effective water shutoff was made. Consequently, the practice in the field previously has been to set a water string at the top of the second zone and produce only this zone. Development of the tools and method of circulated gravel packing by J. B. Nelson Co. of Long Beach, however, have now solved the problem of packing both productive intervals after water shutoff has been effected and led to efficient completion practices in the field.

Special equipment required for circulated gravel packing consists of a special lubricator pump, lead seal adapters, and a circulation jcint, or gravel-packing tool. The lubricator

(Continued on page 106)

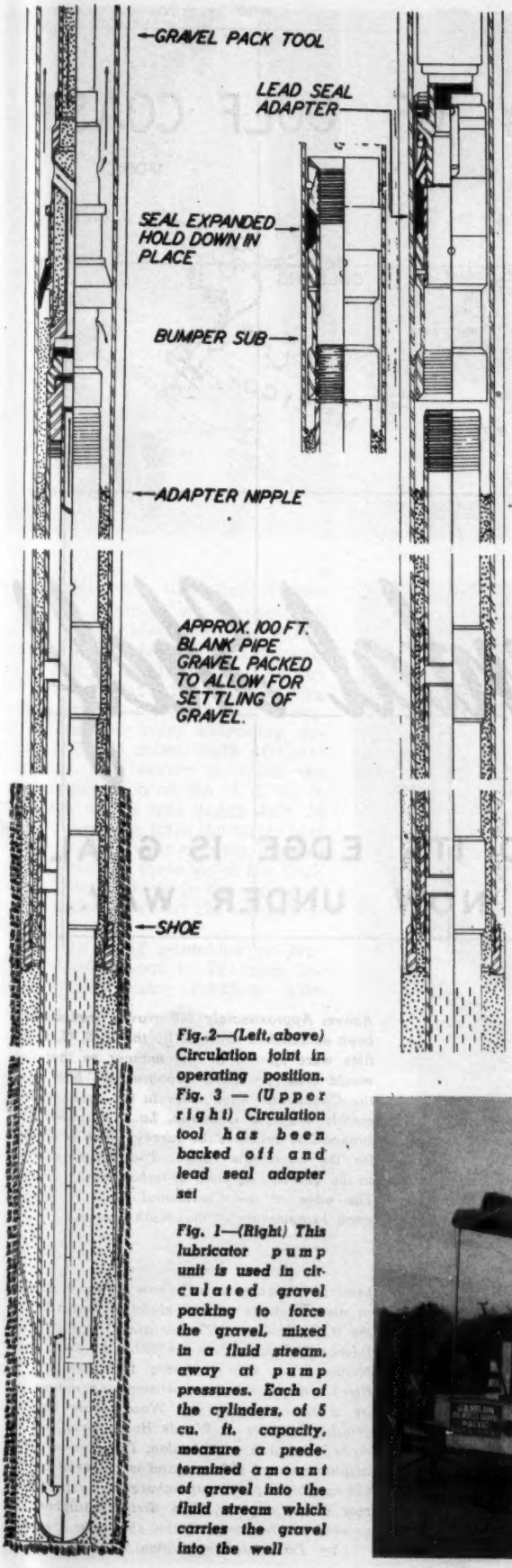

GRAVEL PACK TOOL
LEAD SEAL ADAPTER
SEAL EXPANDED HOLD DOWN IN PLACE
BUMPER SUB
ADAPTER NIPPLE
APPROX. 100 FT. BLANK PIPE GRAVEL PACKED TO ALLOW FOR SETTLING OF GRAVEL.
SHOE

Fig. 2—(Left, above) Circulation joint in operating position. Fig. 3 — (Upper right) Circulation tool has been backed off and lead seal adapter set

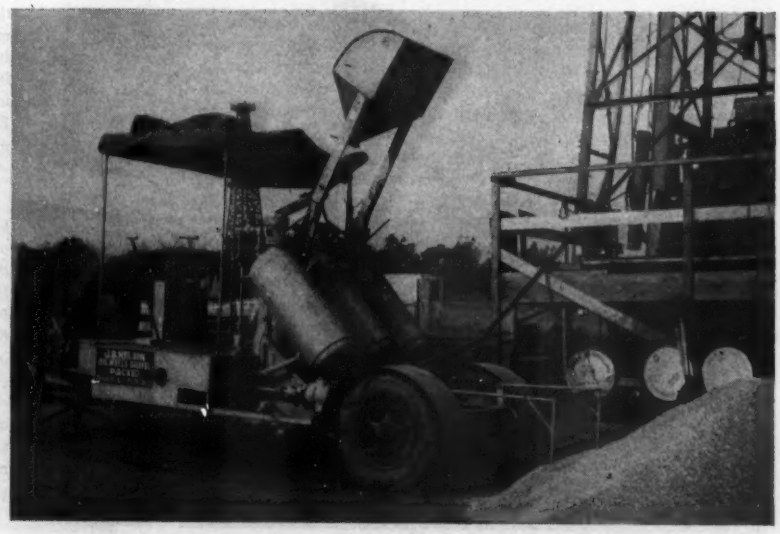
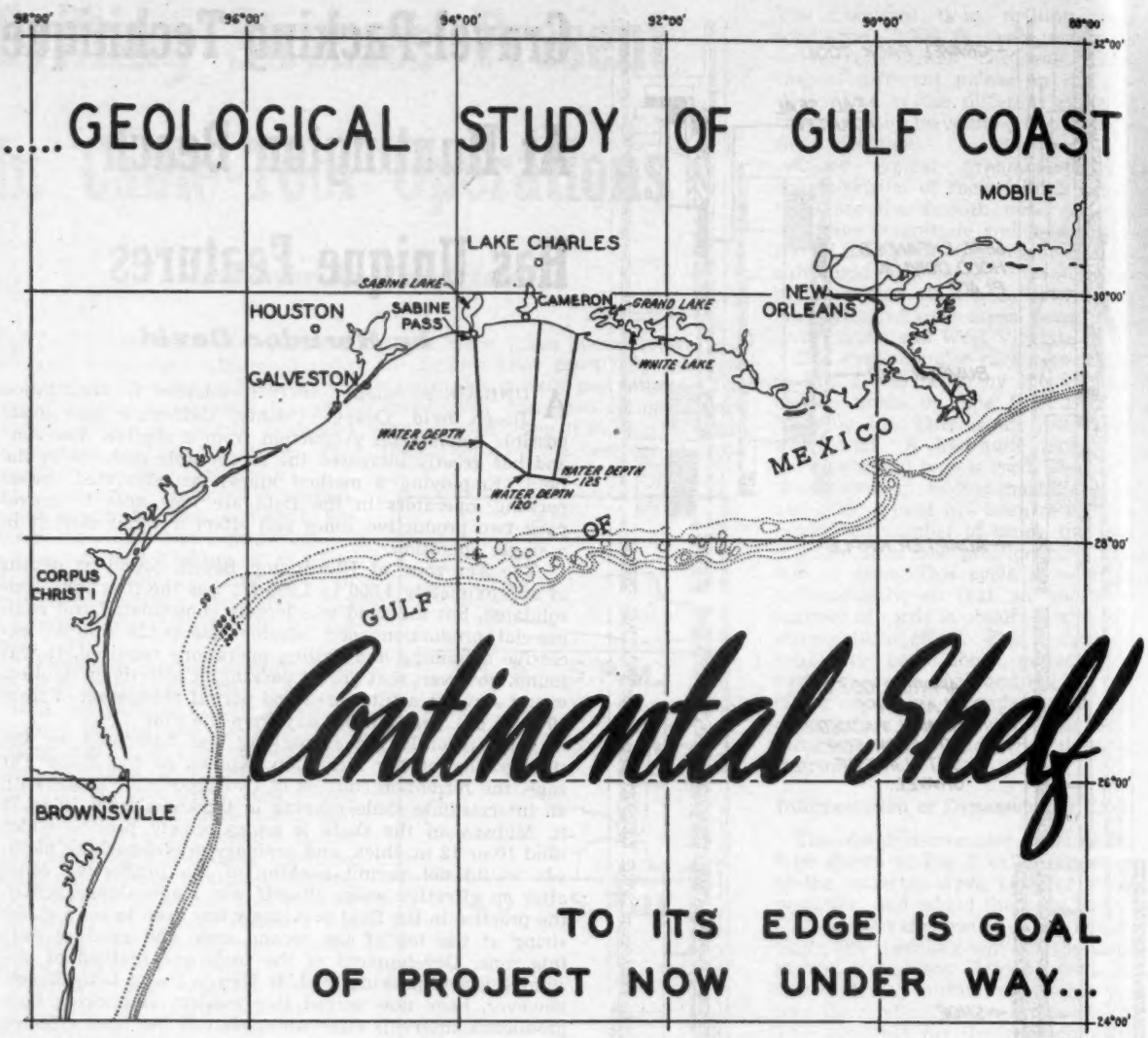
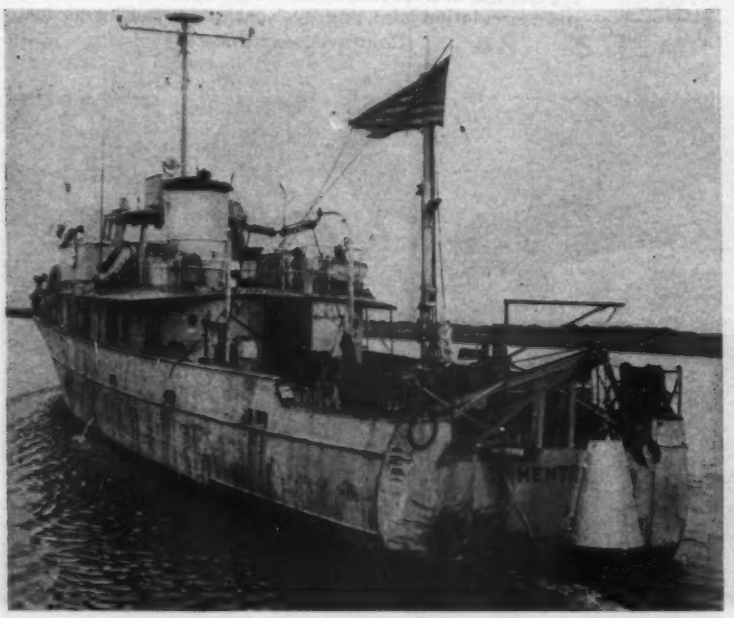


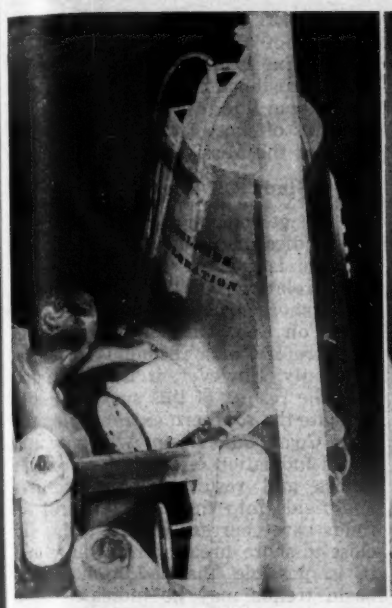
Fig. 1—(Right) This lubricator pump unit is used in circulated gravel packing to force the gravel, mixed in a fluid stream, away at pump pressures. Each of the cylinders, of 5 cu. ft. capacity, measure a predetermined amount of gravel into the fluid stream which carries the gravel into the well





Above: Approximately 200 gravity stations have been established thus far by the U. S. G. S. Profiles were spaced in this manner so that lines would cross prominent topographic "hills" near the Continental Shelf edge in the area approximately south of Cameron, La., 125 miles. The broken line indicates the survey which is planned for the immediate future. The dotted contours in the gulf are on each 50-fathom depth interval. The edge of the Continental Shelf is obvious upon examination of the depth contours

Left: The gravity survey now being conducted at distant points off the shore of Louisiana by the U. S. Geological Survey and Office of Naval Research is made from the 127-ft. by 21-ft. beam Mentor. This ship is being furnished by the Navy, and it is being operated and maintained by a crew supplied by Woods Hole Oceanographic Institute of Woods Hole, Mass., an endowed research organization. The Mentor has a displacement of 178 tons and is powered by two 625-hp. high-speed supercharged Cooper-Bessemer diesel engines. The diving chamber suspended at the stern of the ship was designed by Tidelands Exploration Co., Houston



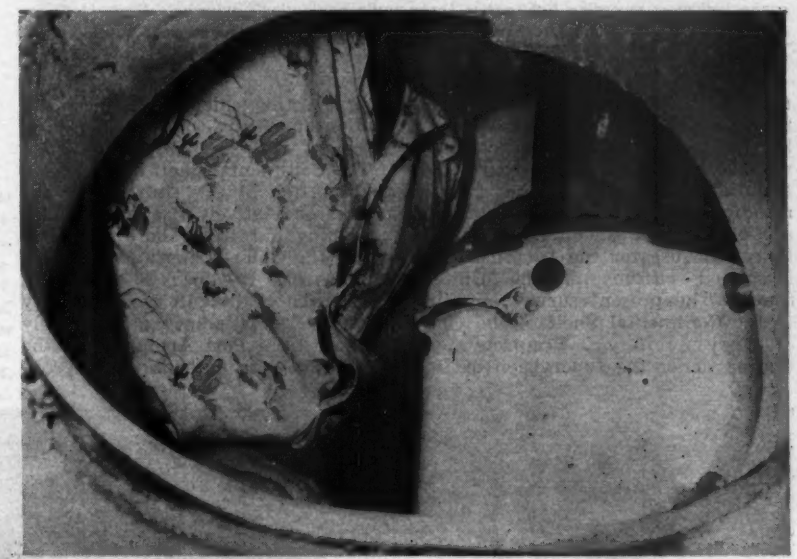
Extreme left: From a platform across stern 1 ft. above the water, gravity-crew member hands North American gravity meter to observer inside diving chamber. Hollow vanes extending down side of chamber to bottom prevent suction effect at base of chamber when lifting off of ocean floor

Left: Diving chamber is being lowered in 125 ft. of water 75 miles south of Cameron, La. For emergency, chamber carries an oxygen canister which will furnish an hour's supply of oxygen for the observer. Chamber is also equipped with mesh containers of lithium hydroxide pellets for absorbing carbon dioxide, and a face mask equipped with an oxygen canister. In case of an emergency beyond the supply of oxygen canister located in the chamber, observer could put on face mask, open valve to flood the chamber, and leave through the escape hatch. As a further precaution against mishap, one man in the gravity crew is a diver, and diving equipment is carried at all times

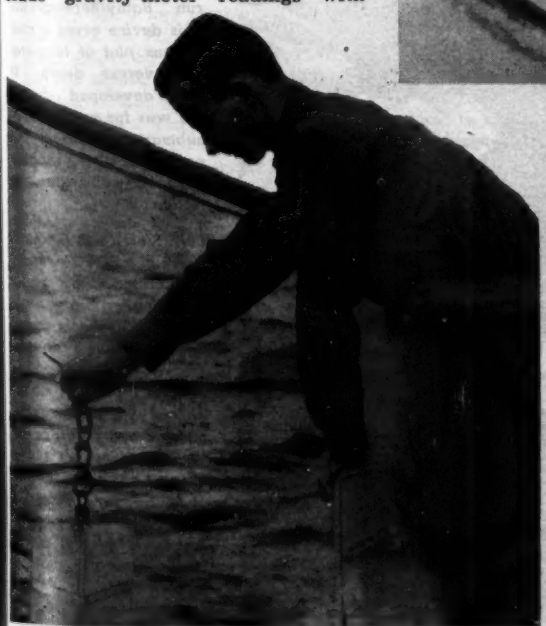
PUSHING back the offshore geological frontier, which previously extended to points 30 miles out in the Gulf of Mexico off the Louisiana shore, the U. S. Geological Survey and Office of Naval Research are now making gravity-meter studies of water bottoms in areas extending approximately 75 miles south of Cameron, La. This survey is under the direct supervision of the U. S. G. S. and work at sea was begun July 14 and will continue until the latter part of the year. If time permits, studies will be made to the edge of the Continental Shelf which, in the area now being studied, is about 125 miles from shore.

The data being assembled on profiles extending out to 75 miles include gravity-meter readings with supplementary information on bottom sediments, topography, temperature structure, and salinity. This joint U. S. G. S. and Office of Naval Research project is the first marine gravity survey made by these departments; and it is also the first work of any type to be conducted by them on the Continental Shelf. Previous structural studies made by the U. S. G. S. have been confined to work extending down to shore lines.

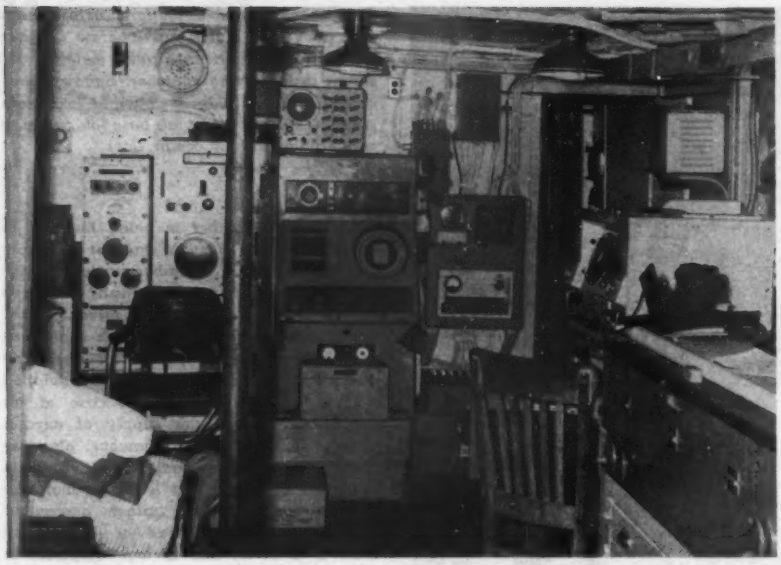
It is the desire of the U. S. G. S. to make a general geological interpre-



Above: Inside view of Tidelands' diving chamber showing position of observer. Chamber is equipped with speaker system. Observer is in constant communication with party chief on board the ship. Speaker system is three-way. Should it be necessary to send diver down, he could talk with both party chief and man in the diving chamber. Gravity reading requires only few minutes depending upon depth of water. Under normal conditions the air trapped in the chamber before being lowered is sufficient for the observer



Left: Jeffery D. Frautschy, in charge of the field work on this project, runs an Emory-Dietz "Snapper" bottom-sediment sampler. During war Frautschy conducted underwater sound research at Navy Radio and Sound Laboratory at San Diego



Ship is well equipped with instruments which greatly facilitate survey work being done by U.S.G.S. and O. N. R. Equipment consists of: Three-centimeter radar with special accurate range indicator; recording fathometer; Loran radio navigation equipment; Mark 14 Sperry gyro compass and a dead reckoning tracer which maintains a continuous plot of ship's location

tation of the Continental shelves surrounding the United States and Alaska. Purpose of these geological surveys is to determine the source and approximate reserve of the natural resources. The result of these surveys are usually published and available for public use for the benefit of all interested citizens of the United States. The present survey pertains to the Continental Shelf of the Gulf of Mexico. Jeffery D. Frautschy, operating under the supervision of Dr. H. R. Joesting, chief of the U. S. G. S. section of geophysics, is in charge of the field work on this project.

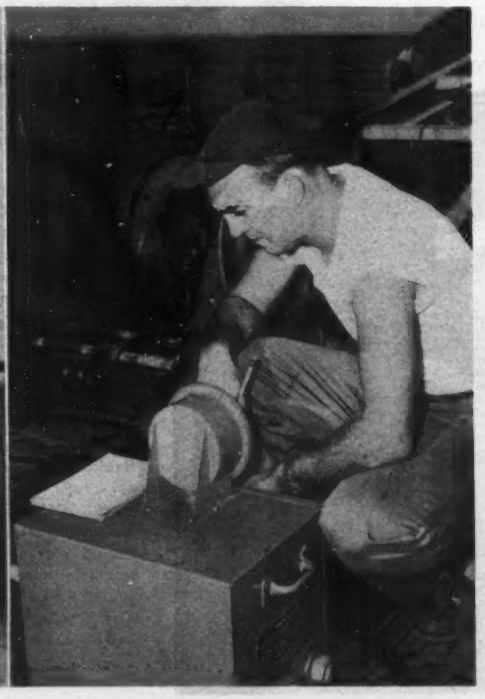
The Continental Shelf is defined as that portion of the Gulf where the bottom is relatively flat and shallow, extending out from shore to a line where the water is approximately 100 fathoms (600 ft.) deep. At this point, the bottom of the gulf drops off very suddenly. At a point approximately offshore from Port Arthur, Tex., the 100-fathom line extends out approximately 125 miles from shore. In the vicinity of Corpus Christi the 100-fathom line is approximately one-half of this distance from shore, and the 100-fathom line is only approximately 10 miles offshore from the outermost point of the Mississippi Delta.

Study Off-Shore Trends

This geological program involving studies of distant offshore water bottoms is for the primary purpose of correlating the knowledge of regional shore structure with that which exists on the Continental Shelf, and is, therefore, of a reconnaissance nature only. However, it is anticipated that the results of this survey should indicate the southern extremity of the Gulf Coast Salt Basin, which would be an indication of the extent of salt domes and resulting oil structures and fields into the Gulf. Several oil fields are currently producing in close-to-shore areas in the gulf, and it is possible that additional salt-basin trends may be indicated as a result of this survey. This survey, therefore, should in some measure give an indication of the possible petroleum reserves which may exist in the gulf.

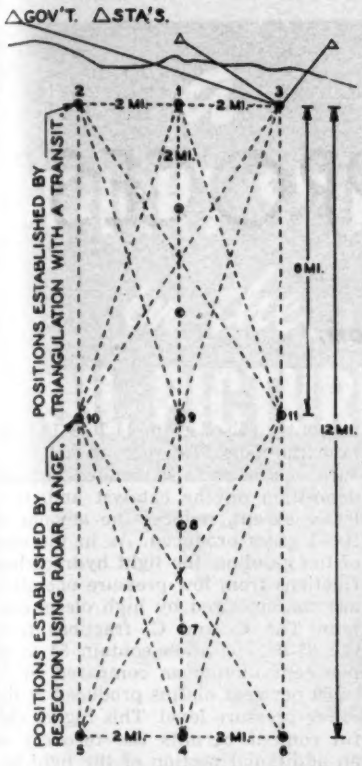
The Navy's interest in this survey is to obtain data which may be an aid to navigation.

The area set up for study is a belt beginning at Lat. 27° 50′ north extended between Long. 93° and 94° west. This extends to about 125 miles south of Cameron, La. In the outer part of this area there are a number of underwater hills which rise from water 60 fathoms in depth to from 9 to 30 fathoms from the surface. No study has ever been made of these



Extreme left: Robert Didham, radio and radar operator, prepares to run Bathythermograph. This device gives a continuous plot of temperature versus depth. It was developed during the war for use by anti-submarine vessels in predicting the probable range of submarine detection

Left: Stewart P. Gagnon, party chief for Tidelands Exploration Co., takes notes called up by observer. Gagnon's crew consists of two observers, a diving chamber supervisor, and a diver. This Tidelands gravity-meter crew, regarded as the most experienced marine party on the coast, recently made a successful gravity-meter survey in the soft water bottoms at the mouths of the Sabine and Calcasieu rivers



In establishing gravity stations a line of three buoys is planted about 2 miles offshore parallel with the beach. The buoys, spaced 2 miles apart, are accurately located by triangulation from Government triangulation stations. With the planting of these buoys, the ship goes south 12 miles from the center buoy (No. 1) and plants buoy to establish gravity station at No. 4. The ship then proceeds 2 miles west to plant buoy No. 5 and establish gravity station. Then buoy No. 6 is planted. From this point the ship goes to a point 2 miles north of buoy No. 4 and establishes gravity station No. 7. No. 7's position is established by radar ranges on buoys 4, 5, and 6. Station No. 8 is located 4 miles north of No. 4. The location of No. 9 (which is halfway between buoys 1 and 4) is located by bearings from 1, 2, and 3 buoys. Stations 10 and 11, 2 miles east and west of No. 9, are located in the same manner. At the time ranges are taken on 1, 2, and 3, ranges are also taken on 4, 5, and 6. After 9, 10, and 11 are located, 4, 5, and 6, as well as 7 and 8, can be plotted by resection. The greatest dependable range of radar, with 4-ft. square biplane window screen targets, is 15,000 yd.

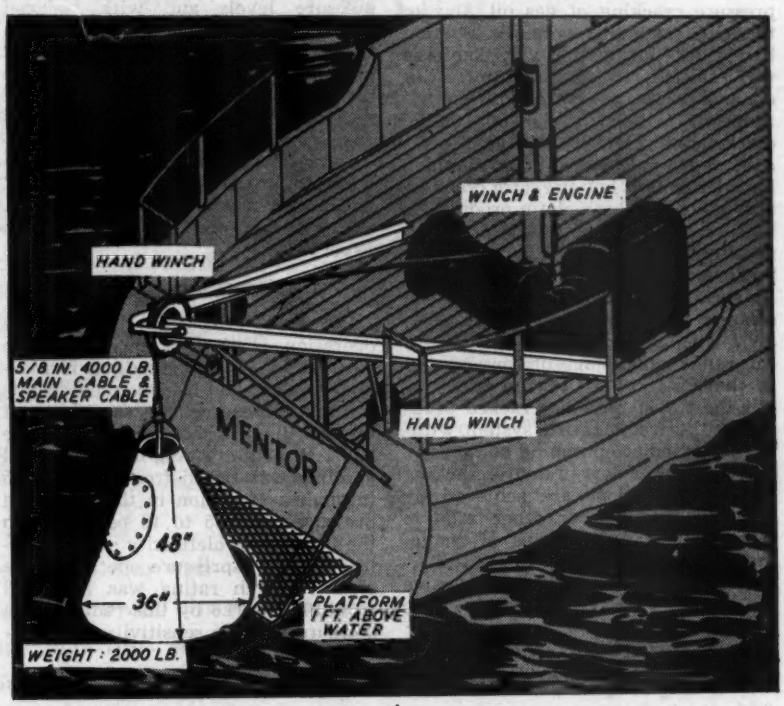
hills and the gravity survey should establish whether they are salt domes, igneous structure, or coral reefs.

Gravity-meter readings on this project are being obtained by a crew of specialists furnished under contract by Tidelands Exploration Co., Houston. At this time over 200 gravity stations have been established on the profiles mapped out by the U. S. G. S. Stations are set up at 2-mile intervals and as high as 24 readings have been made in a period of 26 hours. The actual time required for a reading from the time the observer is lowered to bottom to the time he is back on deck varies between 8 and 15 minutes.

Franco Buys Adair Wells

Ed H. Adair, Wichita independent operator, announced last week he has sold his interest in 89 Kansas wells to Franco Central Oil Co., Wichita, for $1,500,000.

Adair, who had about a half interest in the properties, said the wells are producing about 900 bbl. daily. He retained his drilling equipment and his interest in wells in Rice, Stafford, and Marion counties.



The Tidelands diving chamber with operator and equipment weighs approximately 2,000 lb. and is so designed and constructed to withstand pressure encountered at a depth of approximately 2,600 ft. Ordinarily only one cable is used for lowering and raising the diving chamber. However, as a safety factor, two additional cables are attached to the chamber, either of which is capable of raising the chamber in case of necessity

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RECENT DEVELOPMENTS IN THE

CYCLOVERSION PROCESS

by C. J. Holmers, P. H. Johnson,* and G. M. Brooner**

EARLY semicommercial development work on the Cycloversion process was directed towards low-pressure cracking of gas oil. Due to the need for highly aromatic aviation base stock during the war, emphasis was shifted to the treatment of cracked naphtha at pressures in the range of 75-100 psi. Gas oil can be cracked satisfactorily at these pressure levels although it is common knowledge that low-pressure cracking is conducive to high olefin production, high research octane rating, and high sensitivity or "jump." The use of the higher-pressure levels is advantageous in certain instances, particularly in some of smaller refineries, since a catalyst chamber pressure of 75-100 psi. can replace one stage of compression in the gas-recovery system and permit the transfer of the cracked product to the fractionating system without intermediate pumping equipment. The benefits of low-pressure cracking in such operations are achieved by the use of steam or other relative inert diluent as a means of reducing the partial pressure of the oil.

Where steam costs are excessive the use of low operating pressure is particularly desirable. Operation of the Cycloversion process at lower pressure levels and with reduced amounts of diluent is, of course, entirely feasible. The semicommercial and pilot-plant development work on the Cycloversion process for the past several years has been directed towards a study of the effects of pressure, catalyst, and feed stock as related to product quality and yield. Some representative data bearing on these factors are presented in this paper.

*Phillips Petroleum Co., Bartlesville, Okla

1. Effect of Lower Pressure

Principal effect of low-pressure operation is that of increasing the clear A.S.T.M. octane rating, increasing the clear and leaded research rating and, of course, the sensitivity of the gasoline. As shown in Table 1 the A.S.T.M. octane rating of the cracked gasoline was raised from 80.0 to 81.5 through a reduction in the operating pressure from 85 to 10 psig. Due to the increase in olefinicity of the gasoline with low-pressure operation, the clear research rating was increased from 91.7 to 94.6 by this reduction in pressure and the sensitivity was concurrently raised from 11.7 to 13.1 octane numbers. The use of low-pressure operation also reduces carbon deposition on the catalyst and, to a lesser extent, reduces the amount of fixed gases produced. As in the case of the gasoline, the light hydrocarbon fractions from low-pressure operation are characterized by high olefin content. The C_3 and C_4 fractions from the 85-lb. operation contain 50 to 60 per cent olefins as compared to 70 to 80 per cent olefins produced at the lower pressure level. This higher olefin content permits the recovery of an additional portion of the light hydrocarbons by means of catalytic polymerization or alkylation.

TABLE 1—EFFECT OF OPERATING PRESSURE

		Texas Panhandle			
Crude source					
Operating pressure, psig.		10		85	
Process period, hours		2.5		2.5	
Catalyst		Cyclocel		Cyclocel	
Conversion, per cent		48.5		51.5	
Steam diluent, lb. per bbl.		30		60	
Inspection of charge and products:	Charge	Debutanized gasoline	Catalytic gas oil	Debutanized gasoline	Catalytic gas oil
A.S.T.M. distillation, °F.:					
10 per cent	552	141	510	142	508
50 per cent	603	224	568	228	560
90 per cent	697	355	646	351	642
Gravity, °A.P.I.	36.9	57.2	34.0	58.1	32.8
Bromine number	...	104	...	86	...
Carbon residue, per cent	0.03	...	0.3	...	0.5
R.v.p.	...	6.4	...	6.6	...
A.S.T.M. octane No.:					
0 ml. TEL	...	81.5	...	80.0	...
1 ml. TEL	...	83.3	...	82.9	...
Research octane No.:					
0 ml. TEL	...	94.6	...	91.7	...
1 ml. TEL	...	96.3	...	94.6	...
Product yields, per cent of charge:					
10-lb. gasoline (without poly), vol.	...	34.2	...	33.2	...
10-lb. gasoline (with poly), vol.	...	43.7	...	40.3	...
Outside butane required, vol.	...	1.6	...	none (—1.4)	...
Propane, vol.	...	2.6	...	5.0	...
C_3 and lighter, wt.	...	5.6	...	6.7	...
Carbon, wt.	...	1.5	...	2.7	...

Results of pilot-plant Cycloversion tests of gas oil from western Kansas crude are shown in Table 2. The data shown in the three columns of Table 2 represent increasing depth of single-pass conversion achieved by increasing the operating temperature. In the most severe of these tests the effect of high carbon deposition on the catalyst is reflected in a reduction in A.S.T.M. octane rating from 81.1 to 79.4. As seen from these data operation at a moderate conversion per pass is advantageous both as to octane rating and yield of gasoline.

One of the outstanding differences between the gasolines produced by catalytic and thermal cracking lies in the octane rating of the higher-boiling portions. Gasoline produced by catalytic cracking is characterized by the high octane rating of the high-boiling fractions. Table 3 shows the octane rating and hydrocarbon-type composition of gasoline obtained by catalytic cracking of the western Kansas gas oil. It is noted from these data that the A.S.T.M. octane rating drops to a minimum of 79 as the boiling range of the gasoline approaches 300°-325° F. and then increases to 80.5 in the 350°-400° F. boiling range. As the boiling range increases the olefin content decreases and the aromatic content increases with the research rating and, consequently, the sensitivity of the gasoline decreasing somewhat with increase in boiling point.

2. Effect of Naphtha in Gas-Oil Charge

Presence of straightrun naphtha in the gas-oil charge has a marked ef-

a BRIGHT SPOT in the OIL PICTURE

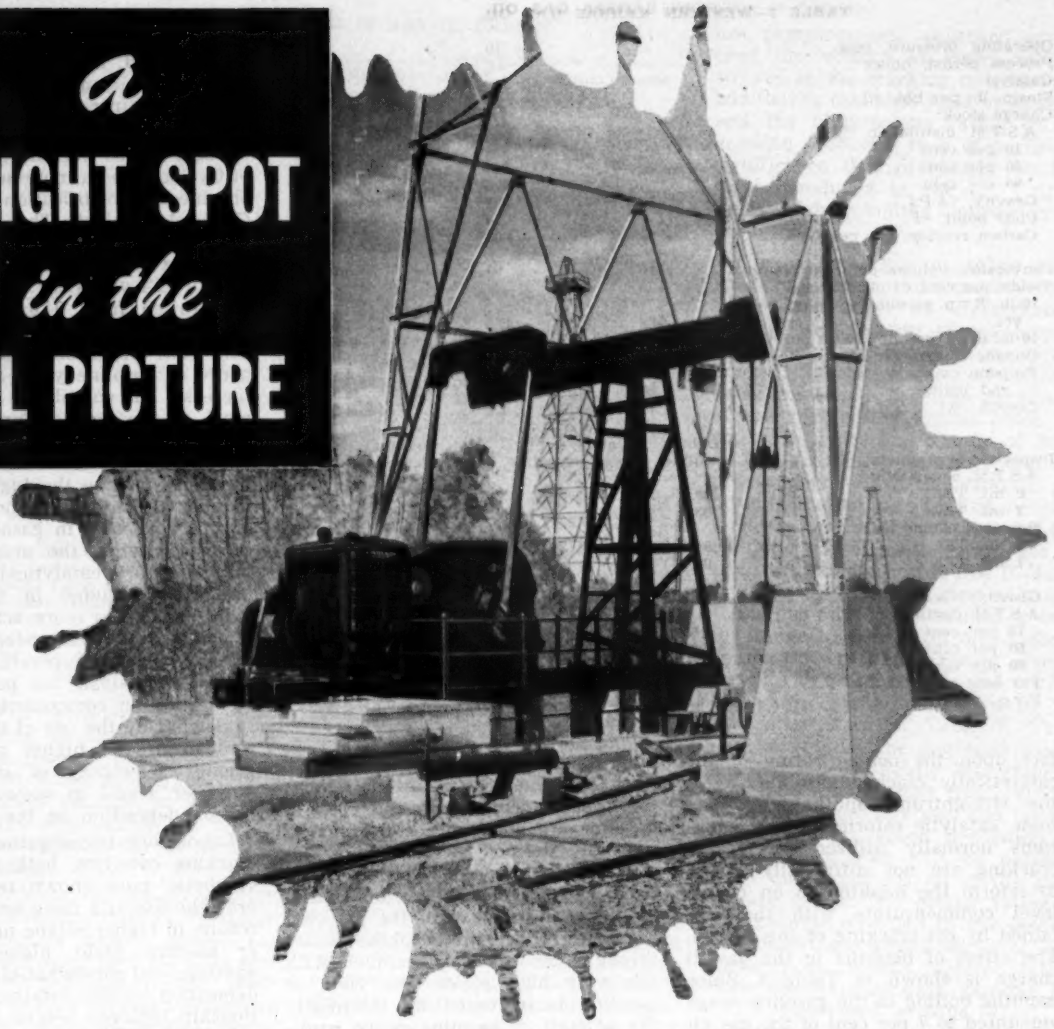

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TABLE 2—WESTERN KANSAS GAS OIL

Operating pressure, psig.			10			
Process period, hours			2.5			
Catalyst			Cyclocel			
Steam, lb. per bbl. oil			30			
Charge stock:						
A.S.T.M. distillation, °F.:						
10 per cent			602			
50 per cent			646			
90 per cent			710			
Gravity, °A.P.I.			32.2			
Pour point, °F.			50			
Carbon residue, per cent			0.03			
Conversion, volume per cent charge	41		50		67	
Yields, per cent of oil charge:						
10-lb. R.v.p. gasoline (without poly), vol.	30.8		35.3		37.6	
10-lb. R.v.p. gasoline (with poly), vol.	37.4		39.6		45.9	
Outside butane required, vol.	1.3		1.5		1.0	
Propane, vol.	2.2		2.3		4.3	
C_3 and lighter, wt.	4.9		7.4		13.6	
Carbon, wt.	1.45		2.3		4.2	
Inspection of products:	Debut. gasoline	Cat. gas oil	Debut. gasoline	Cat. gas oil	Debut. gasoline	Cat. gas oil
A.S.T.M. octane No.:						
0 ml. TEL	80.4	...	81.1	...	79.4	...
1 ml. TEL	83.3	...	83.6	...	82.6	...
Research octane No.:						
0 ml. TEL	94.3	...	94.5	...	93.5	...
1 ml. TEL	96.4	...	97.0	...	96.0	...
Gravity, °A.P.I.	55.1	29.3	54.9	27.1	54.1	20.9
A.S.T.M. distillation, °F.:						
10 per cent	150	526	144	515	138	528
50 per cent	244	598	237	598	237	592
90 per cent	362	665	360	672	362	690
Per cent evap. at 212° F.	37	...	40	...	41	...
R.v.p.	6.0	...	6.5	...	6.7	...

fect upon the octane rating of the catalytically cracked gasoline. While the straightrun naphtha undergoes some catalytic reforming, the conditions normally utilized for gas-oil cracking are not sufficiently severe to reform the naphtha to an octane level commensurate with that obtained by cat cracking of the gas oil. The effect of naphtha in the gas-oil charge is shown in Table 4. Since naphtha boiling in the gasoline range amounted to 7 per cent of the gas oil approximately 10 per cent of the gas oil was removed as an overhead product to insure a completely naphtha-free gas oil charge. Tests were run both with Cyclocel catalyst and with a modified Cyclocel. With either of these catalysts the removal of naphtha from the charge stock resulted in an improvement of 2 to 3 A.S.T.M. octane numbers and 3 to 5 research octane numbers. The magnitude of the improvement is dependent, of course, upon the amount of naphtha removed. With naphtha present in the charge the apparent conversion and yield of gasoline are high since conversion is normally defined as 100 minus per cent boiling above 400° F.; thus, any naphtha in the gasoline range automatically is included in the per cent converted. Since this naphtha passes through the catalyst chamber with relatively high yields, the yield of gasoline is increased by essentially the amount of gasoline range naphtha in the charge. When corrected for naphtha present in the feed, the yield-conversion relationship is essentially the same as obtained in charging the gas oil with naphtha removed.

In addition to the effect on octane rating and olefin content of the cracked gasoline, the presence of naphtha in the gas-oil charge is also reflected in the volatility of the gasoline. As is noticed in Table 4, the presence of the high-boiling straightrun naphtha increases the proportion of high-boiling material in the cracked gasoline and, in the particular cases shown here, removal of the naphtha effected an increase of 7 per cent in the per cent evaporated at 212° F.

Table 4 also permits a comparison of Cyclocel and a more active catalyst obtained by modification of the usual Cyclocel catalyst. The more active catalyst raised the A.S.T.M. octane rating of the cracked gasoline from 81.5 to 82.4 while the research rating was raised from 94.6 to 96. octane numbers. This increase in octane number, however, is obtained at the expense of gasoline yield and with an increase in volatility, consequently most of the octane improvement is due to the production of a greater proportion of low-boiling gasoline fractions. Due to the higher yield of C_3 and C_4 components practically all of this reduction in gasoline yield is recovered when the propylenes and butylenes are catalytically polymerized and included in the gasoline yield. Since the more active catalyst effects a given conversion of the gas oil at a lower temperature than the Cyclocel catalyst, the production of C_2 and lighter components is reduced somewhat by the use of the more active form; the higher activity and greater selectivity of the catalyst, however, result in somewhat higher carbon deposition on the catalyst.

Laboratory investigations of many cracking catalysts, both natural and synthetic, have shown that, in general, the use of a more active catalyst results in higher octane number, lower gasoline yield, higher volatility gasoline, and somewhat higher carbon deposition on the catalyst. The relationship between octane ratings and volatility of the gasoline produced over numerous different catalysts studied in the laboratory evaluation of catalysts was so marked as to permit close estimation of the A.S.T.M. octane number from A.S.T.M. distillation of the gasoline.

3. Cycloversion of Heavy Oils

Current demand for high-octane gasoline and various grades of distillate fuels and diesel oil makes it essential that reduced crude be converted to gasoline and distillate rather than to heavy residual fuel oils. Catalytic cracking of the high-boiling oils meets these requirements in that the cracked gasoline produced has a high octane rating, the yield of gasoline is exceptionally good, and residual-fuel-oil production is low. Direct cracking of topped crude is normally not feasible when utilizing catalytic cracking because of catalyst poisoning due to the salt present in the topped crude and because of high carbon deposits on the catalyst produced by the asphaltic constituents. Topped crude can be converted into charging stocks, however, either by vis-breaking or coking whereby the

TABLE 3—CHARACTERISTICS OF CATALYTICALLY CRACKED GASOLINE CUTS

Cut number—	1	2	3	4	5
Per cent of 400° F. end-point gasoline	20.4	20.0	20.4	20.6	18.6
A.S.T.M. octane No.:					
0 ml. TEL	82.1	79.5	79.4	79.0	80.5
1 ml. TEL	85.4	82.9	82.9	83.1	83.6
Research octane No.:					
0 ml. TEL	96.9	94.3	92.2	91.3	90.4
1 ml. TEL	99.0	97.2	95.0	94.9	93.2
Hydrocarbon type, per cent:					
Olefin	73	74	66	46	26
Aromatic	0	4	13	34	55
Paraffin-naphthene	27	22	21	20	19
Gravity, °A.P.I.	80.5	64.0	52.7	43.7	35.0
A.S.T.M. distillation, °F.:					
10 per cent	92	170	225	290	368
50 per cent	107	177	238	304	381
90 per cent	132	197	257	324	401

TABLE 4—EFFECT OF NAPHTHA IN GAS-OIL CHARGE

Crude source	Texas Panhandle			
Gas-oil charge	Naphtha removed		Naphtha present	
A.S.T.M. distillation, °F.:				
First drop	516		278	
5 per cent	542		438	
10 per cent	552		482	
50 per cent	603		606	
90 per cent	697		718	
Gravity, °A.P.I.	36.9		37.2	
Catalyst	Cyclocel	Modified Cyclocel	Cyclocel	Modified Cyclocel
Conversion, vol. per cent charge	48.5	50	50.5	51
Inspection of debutanized gasoline:				
A.S.T.M. octane No.:				
0 ml. TEL	81.5	82.4	78.8	79.6
1 ml. TEL	83.3	84.4	81.3	82.8
Research octane No.:				
0 ml. TEL	94.6	96.5	90.1	91.1
1 ml. TEL	96.3	97.9	93.0	94.2
Bromine number	104	94	84	76
Gravity, °A.P.I.	57.2	57.5	55.7	57.5
R.v.p.	6.4	7.1	6.3	6.6
A.S.T.M. distillation, °F.:				
10 per cent	141	127	145	130
50 per cent	224	211	249	227
90 per cent	355	355	371	369
Per cent evap. at 212° F.	45	51	38	44
Product yields, per cent of charge:				
10-lb. gasoline (without poly), vol.	34.2	31.9	38.0	33.45
10-lb. gasoline (with poly), vol.	43.7	43.5	46.6	45.2
Outside butane required, vol.	1.6	none (—0.6)	1.9	none (—0.4)
Propane, vol.	2.6	2.7	2.3	2.4
C_2 and lighter, wt.	5.6	5.5	5.5	4.7
Carbon, wt.	1.5	2.3	1.3	1.9

heavy oil is converted to hydrocarbons boiling in the normal gas-oil range; alternately the high-boiling crude fraction can be charged directly if carbon residue is kept low through the removal of the asphalt by vacuum distillation or a deasphalting step.

Table 5 shows the results of pilot-plant Cycloversion tests of decarbonized Panhandle topped crude. The topped crude used in these tests represented 20 per cent of the crude while the asphalt removed amounted to 5.65 per cent of the original crude. As shown in Table 6 the vacuum distillation of this deasphalted topped crude shows a 5 per cent distillation temperature of 915° F. and a 60 per cent temperature of slightly over 1,100- F. It will be noted that the carbon residue (Ramsbottom) was 1.84 per cent, a value somewhat higher than desired since a high carbon residue in the charge stock normally produces a high carbon deposition on the catalyst.

The combination of hot catalyst and liquid oil can always be expected to result in higher carbon deposition than would be encountered in vapor-phase treating. For that reason low-pressure operation and the use of a diluent are particularly advantageous in catalytic cracking of the heavy oils since maximum vaporization of the oil is effected. The high carbon deposition on the catalyst accompanying the cracking of heavy stocks also deactivates the catalyst rapidly and shorted processing periods are utilized. Table 5 shows the results of pilot-plant tests on deasphalted topped crude at 85, 30, and 10 lb. catalyst chamber pressure. It has been noted that while the increase of steam diluent from 60 to 100 pounds per barrel of oil did show some improvement in the clear octane rating the corresponding advantage, when leaded ratings are considered, is considerably less. In most cases a diluent rate of 30-50 lb. of steam per barrel of heavy oil will give the optimum results when operating at 10 lb. chamber pressure.

If the propylene and butylene are recovered as motor fuel via catalytic polymerization, the yield of 10-lb. gasoline, particularly in the tests at low pressures, will approach or exceed the volume of heavy oil destroyed in the cracking operation. In addition to this high yield of gasoline and the high octane rating of the gasoline produced, it is of particular significance that practically no fuel oil is produced in the cracking of this higher-boiling topped-crude charge stock.

The catalytic gas oil, taken overhead to 95 per cent recovery, contains practically no hydrocarbons boiling in the range of the topped-crude charge stock. The characteristics of the catalytic gas oil obtained at 50 per cent single-pass conversion of the deasphalted topped crude are shown in the second column of Table 6. The distillation indicates that approximately half of this catalytic gas oil is in the boiling range of distillate fuels. Comparing the properties of this catalytic gas oil with virgin gas oil from the same crude source (Column 3, Table 6) it is seen that this synthetic gas oil is quite similar in boiling range to the virgin oil. A direct comparison of the cracking characteristics of this catalytic gas oil and the virgin gas oil is shown by the pilot-plant data in Table 7. These data show that the degraded charge stock produces slightly less gasoline, less light unsaturated hydrocarbons, somewhat more dry gas, and considerably higher carbon deposition on the catalyst than will be obtained from the virgin gas oil of the same boiling range. The octane rating of the gasoline obtained in the second-pass cracking is somewhat lower, particularly as regards research rating, than the corresponding gasoline ob-

(Continued on page 107)

TABLE 5—PANHANDLE DEASPHALTED TOPPED CRUDE

Pressure, psig.	85	30	10
Process period, hours	1	1	1
Top catalyst bed temperature, °F.	925	955	1,005
Catalyst	Cyclocel		
Oil rate, bbl. per ton per hour	5.2	5.45	5.1
Steam, lb. per bbl. oil	63	65	100
Conversion, vol. per cent charge	52	46	52
Yield, per cent of charge:			
10-lb. gasoline (without poly), vol.	42.2	43.0	47.8
10-lb. gasoline (with poly), vol.	47.1	48.4	54.0
Outside butane required, vol.	none (—0.5)	3.1	2.6
Propane, vol.	4.8	1.7	2.3
C_2 and lighter, wt.	5.0	4.0	4.9
Carbon, wt.	7.0	3.7	3.85
Characteristics of debutanized gasoline:			
A.S.T.M. octane No.:			
0 ml. TEL	72.5	75.2	77.3
1 ml. TEL	77.0	78.2	79.0
Research octane No.:			
0 ml. TEL	80.7	86.3	89.4
1 ml. TEL	86.2	90.0	91.8
R.v.p.	6.0	4.8	5.0
Bromine number	69	88	97
Sulfur, per cent	0.07	0.12	0.13
Gravity, °A.P.I.	58.5	58.2	58.0
A.S.T.M. distillation, °F.:			
Initial	107	109	106
10 per cent	141	155	152
30 per cent	196	198	197
50 per cent	261	252	255
70 per cent	319	310	311
90 per cent	373	368	372
End point	408	406	408

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Today's experience indicates that the cost of drilling operations has approximately doubled for every 5,000 feet of hole.

Statistics show that the average drilling depth is increasing each year, and that more powerful and more costly equipment is needed to reach these new depths. Patterson-Ballagh LIPPED Casing Protectors and Drill Pipe Stabilizers cut ever-increasing drilling costs by saving wear on newer, heavier equipment, casing and drill pipe. You get many more feet of hole per string of tools operated, with rubber minimizing friction and wear.

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MARIETTA COLLEGE

Science Hall, Marietta College, which houses the P. E. school

SALIENT FACTS AND FIGURES

General.—Located at the junction of the Muskingum and Ohio rivers, Marietta, Ohio, was the original outpost of civilization west of the Appalachians. The successor to Muskingum Academy, founded in 1797, Marietta was granted a charter by the state legislature in 1835. The petroleum school is administered by the trustees of Marietta College and an advisory committee of oil men.

Buildings and grounds.—The Marietta College campus was provided through gifts of the Sons of the Original Pioneers, and added to from time to time by the trustees. The Edwy R. Brown School of Petroleum is housed in Science Hall, a fireproof building of approximately 30,000 sq. ft. of floor space. Students have access to the Campus Martius Museum, which houses historical records from the earliest pioneer days.

Calendar.—The school operates on the semester system—fall, spring, and summer.

Expenses.—Total necessary student expenses average $440 per semester.

C. C. HOGG *E. S. MERRIAM* *LAWSON SCOTT*

THE Edwy R. Brown School of Petroleum at Marietta College, although it is part of the oldest educational institution in the oil fields, is probably the youngest oil school.

Marietta College is the outgrowth of Muskingum Academy, the first institution of higher learning in the Northwest Territory. It was established in 1797, and in 1835 a charter was granted by the state of Ohio.

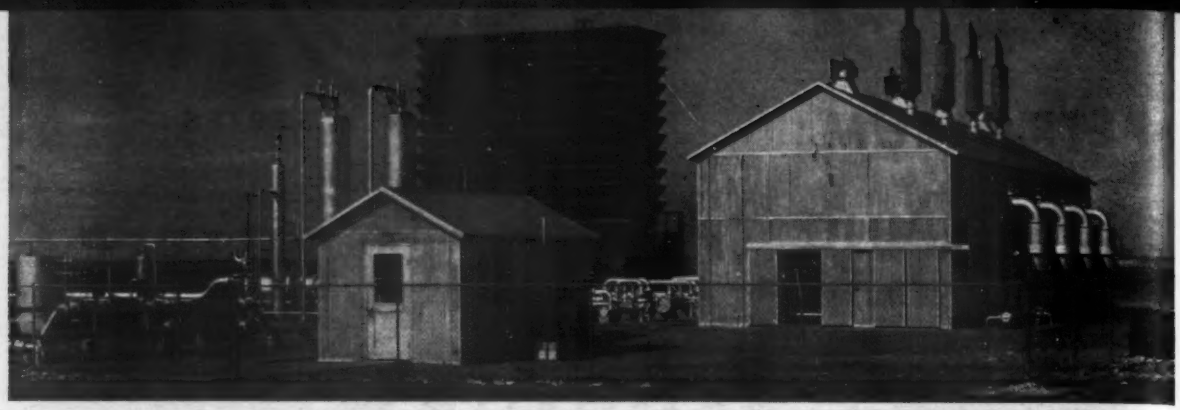
In 1945-46, a full program of courses was instituted leading to the degree of bachelor of science in petroleum. Since Marietta already had courses in geology, mathematics, chemistry, physics, and business training, it was a short step to round out a satisfactory program by addition of engineering courses and providing for suitable laboratory work.

Early secondary-recovery work in the United States was instituted in the second Cow Run sand around Marietta. In the immediate vicinity oil is produced from many different oil sands varying in depth from seepages at the surface to wells several thousand feet deep. Because of Marietta's location near this pool and other Appalachian oil fields, much of the laboratory work is actually carried on in the field, with the cooperation of local operators.

The petroleum school is housed in the New Science Hall. In addition to general sciences, laboratories are provided for complete core analysis, migration and grain size studies, oil and gas analysis, and various studies having to do with reservoir behavior and testing of oil-field equipment.

Enrollment of the petroleum school currently totals 104. Requirements for graduation with the degree of bachelor of science in petroleum are 120 academic hours—96 of which are prescribed courses. Twenty-four hours may be arranged depending upon branch of industry in which the student expects to be employed. In addition to this, the equivalent of 24 academic hours is required, covering first-hand experience on the level where oil or gas is handled, such as surveying, mapping, drilling, production, or marketing experience.

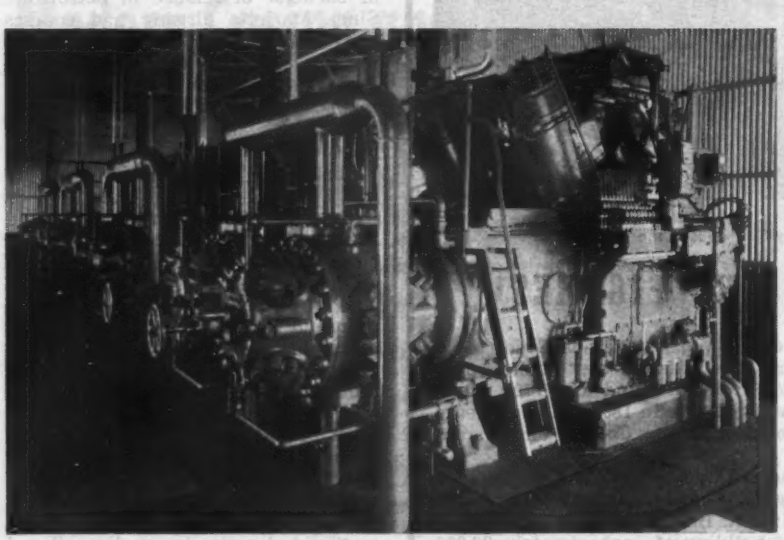
C. C. Hogg (B.S. in mechanical engineering, Cornell) is director of the Edwy R. Brown School of Petroleum. He has been very active in the Pennsylvania oil business since 1919, principally as general manager of National Petroleum Co., Titusville.



The plant occupies a site 170 by 230 ft. adjacent to the fresh-water supply and electric-power lines. Small building in the foreground serves as a combination office, storehouse, and workshop

New Gulf Oil Plant in West Texas Combines Gas Lift and Repressuring

by George Weber



(Above) Compressor in foreground compresses 300-psig. gas to 600 psig. for injection to the field reservoir. The four GMV-4 compressor units will handle 10,000 M.c.f. of sour residue gas daily, discharging 5,000 M.c.f. at 300 psig. for gas lift and 5,000 M.c.f. at 600 psig. for the trial pressure-maintenance program

(Below) The direct-fired heater and still at the left strip the diethylene glycol dehydrating agent of absorbed water. The two contactors at the right process the two compressed gas streams

A NEW combination gas-lift and pressure-maintenance plant operated by Gulf Oil Corp. in McElroy field marks another important increment in the industry's program for conservation of West Texas casing-head gas. Utilizing unmarketable, sour residue from a nearby gasoline plant, the project serves a dual purpose in the company's plan for increasing oil production and ultimate recovery from the major 20-year-old field.

The plant more than doubles available gas-lift gas for an expanding artificial-lift program. It also provides high-pressure gas for field experimental work now being conducted to determine the feasibility of pressure maintenance.

McElroy, having produced in excess of 170 million barrels of oil, presently totals about 720 wells of which 90 per cent are on artificial lift. Gulf operates over 50 per cent of wells in the field and since gas lift predominates as that operator's local lifting medium, a sizable present and future

demand for pressure gas is indicated. Important reserves remain to be recovered by normal depletion methods, and the possibility of success in the current pressure-maintenance trial program may further augment the field's ultimate crude recovery.

The new plant has a capacity for compressing and dehydrating 10,000 M.c.f. of low-pressure residue gas daily, discharging 5,000 M.c.f. at 300 psig. for gas lift and 5,000 M.c.f. at 600 psig. for pressure maintenance. For gas lift, it supplements the previous field supply of 4,500 M.c.f. provided by an old compressor station and a nearby gasoline plant.

Incoming gas is water saturated at 30 psig. and is extremely sour, containing an average of about 5,000 grains of hydrogen sulfide per 100 cu. ft. This necessitated dehydration of the compressed gas before its return to leases, and the high sulfur content favored a liquid-type dehydration agent. Accordingly, facilities employing diethylene glycol were incorporated in the plant design.

Plant Operation Flexible

The rated load requirements of the plant called for a total of 1,600 hp. compressor capacity. This is provided by four 400-hp. GMV-4 units. The smaller compressors were chosen to provide greater flexibility of operation, allowing breakdown or shutdown of individual units without materially affecting the total plant load. Of the four compressors, three handle gas in two pressure stages from 30 to 120 psig. and thence to 300 psig. The fourth unit takes suction at 300 psig. and boosts a fraction of the gas throughput to 600 psig., the pressure required for gas return to the reservoir.

The plant site was chosen on high ground adjacent to the field's freshwater storage and distributing station, also near an electrical transmission line. Ground was broken in March 1946 and initial operation began the following September. Caliche, encountered at 4 ft. below the surface, provided a bearing surface suitable for compressor foundations, each unit requiring 33 yards of reinforced concrete.

The plant is designed to give easy accessibility for repair and maintenance of all of its component units. Welded lines for gas, water, and oil are laid below ground and floor level, yet within easy reach, in concrete trenches covered with steel tread plates. The oil coolers, ordinarily installed on the compressors between the power cylinders, were placed immediately outside the compressor building. This provides more room for cleaning and repairing coolers, and also makes the engine power cylinders more accessible.

Gas Flow Plan

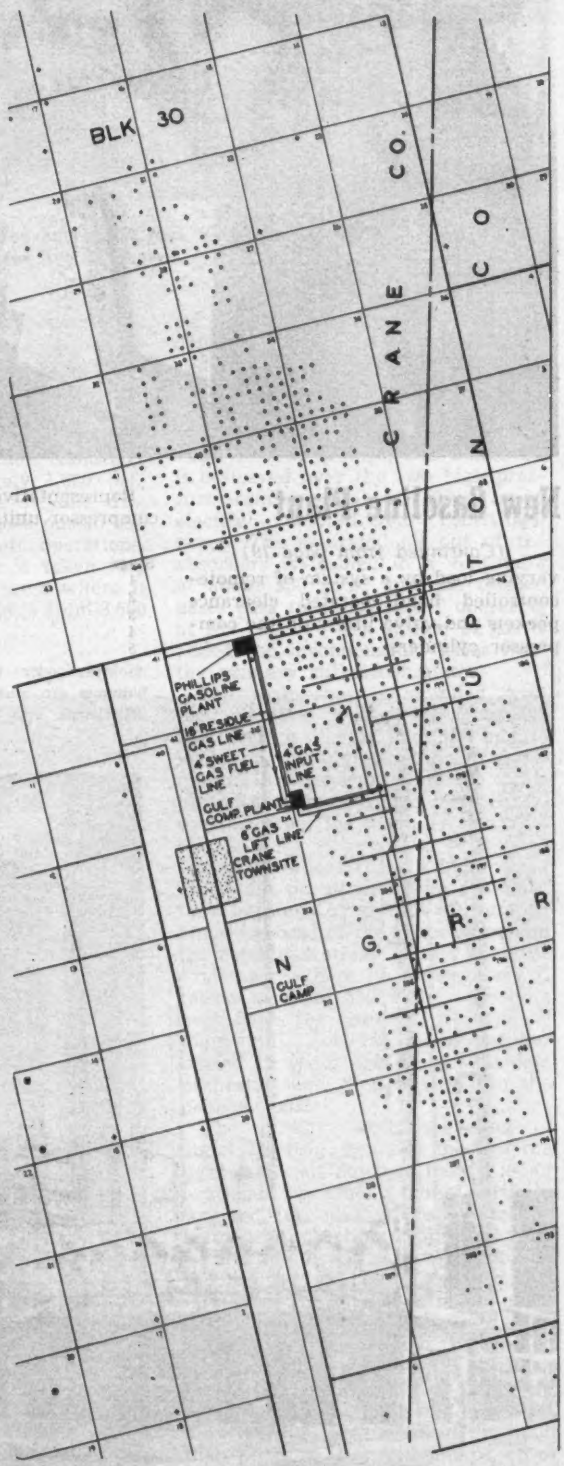
Sour residue gas from the field extraction plant enters the compressor station in a 16-in. line. A 4-in. line provides sweetened fuel gas for the engine-driven compressors and the glycol still.

Incoming sour gas first enters a scrubber equipped with an automatic liquid-level dump value and a warning system comprising both an electrical buzzer and a light. From the scrubber, gas enters the suction header feeding three compressors. Following each pressure stage, gas passes atmospheric cooling coils and scrubbers. At 300 psig. the gas stream is divided. That fraction required for gas lift passes to the base of a 4 by 16-ft. vertical contactor column packed with berl saddles, over which passes diethylene glycol at 85° F. at a rate of 3.5 gal. per minute. From the top of the contactor, the dried gas is metered directly into a 6-in. line serving the gas-lift system in the field.

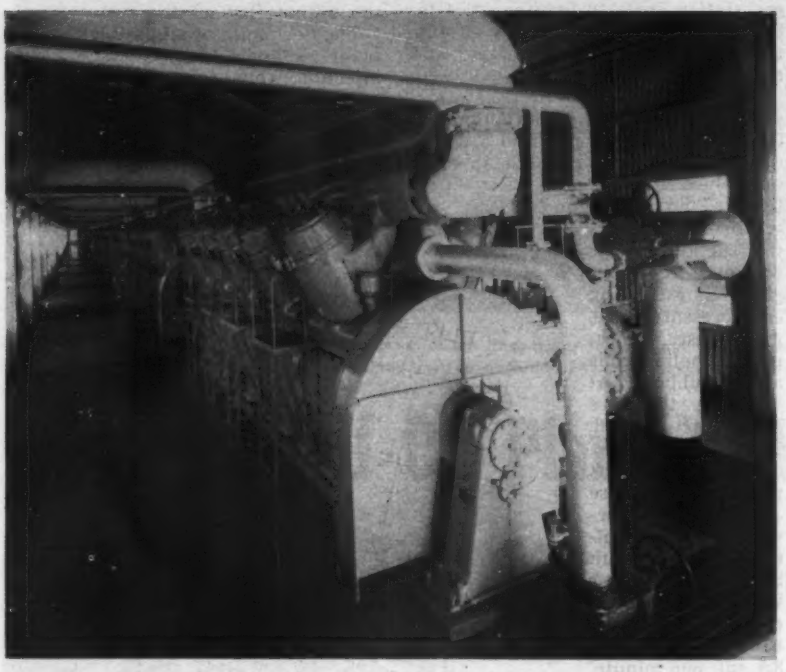
The high-stage compressor takes suction from the second-stage scrubber and that gas not diverted for gas lift is compressed to 600 psig., cooled, scrubbed, and dehydrated by contact with 1.5 gal. per minute of the drying agent in a contactor similar to that installed in the gas-lift treating section. It is then metered, moving to the field-injection system in a 4-in. line where its flow to input wells is automatically regulated by individual flow controllers at each well location. Excess gas not used for injection may be diverted through a field regulator and meter into the gas-lift system. The volume of incoming gas to the plant is governed by a regulator valve on the incoming supply line, actuated by a pilot-operated valve governed in turn by the output flow of the two systems.

The dew point of all gas leaving the plant is approximately 30° F. Two injection wells are currently taking gas, and six additional input wells are included in the future pressure-maintenance trial program.

(Continued on page 117)



Map showing Gulf's initial piping and plant layout for gas-lift and repressuring at McElroy



(Left) Compressor room, showing closeup of power cylinders of No. 1 compressor. Equipment in room consists of nine 3-stage 1,000-hp. 300-r.p.m. V-type units, and three 800-hp. 2-stage units. All gas compressor units are complete in themselves. For example, No. 1 unit has two first-stage compressor cylinders, one second-stage cylinder, and one third-stage cylinder. The three high-pressure units each have two fourth-stage compression cylinders and two fifth-stage cylinders. Multiple-stage compression allows for complete load balance throughout the plant through all compressors

New Gasoline Plant

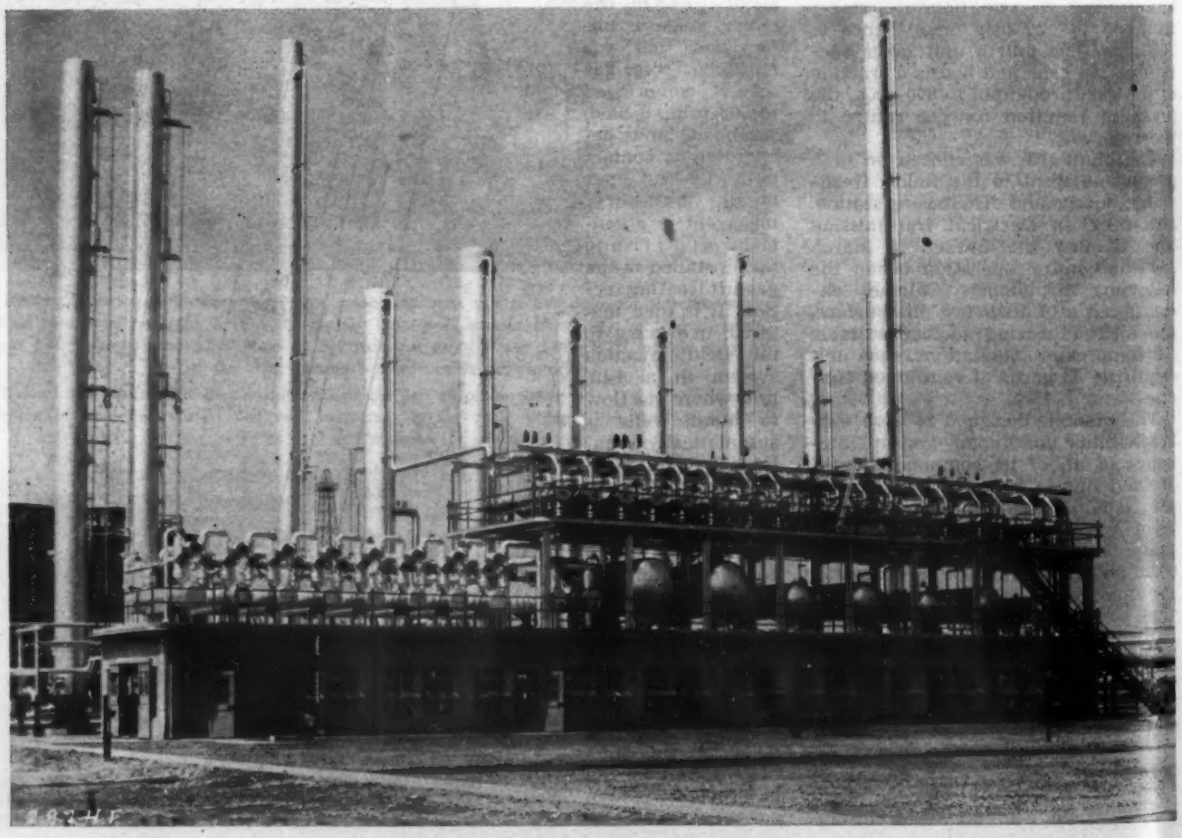
(Continued from page 79)

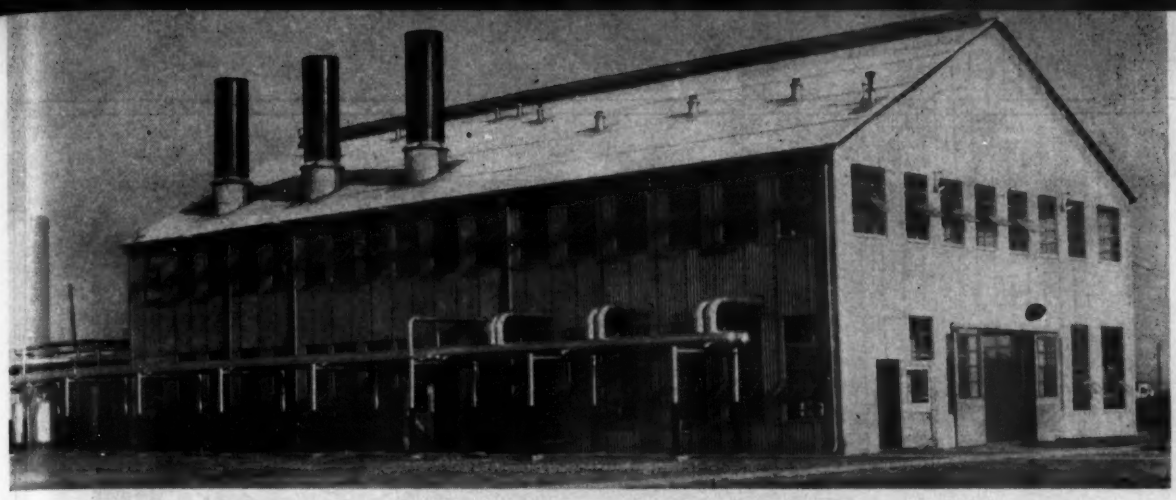
varying load by a system of remote-controlled hand-operated clearance pockets and valve lifters on the compressor cylinders.

Representative pressures on the compressor units are shown below.

Stage	Suction, psig.	Discharge, psig.
1	3	20
2	28	159
3	155	700
4	677	1,750
5	1,710	3,430

(Below) From left to right in the process unit are shown: (1) and (2) absorbers, (3) reabsorber, (4) primary fat-oil stripper, (5) main still, (6) deethanizing column, (7) debutanizing column, (8) depropanizing column, (9) depentanizing column, (10) splitter (which can be used for splitting either pentanes or butanes). Note downward progression of gas from towers through condensers into elevated accumulators, giving a constant head pressure above pumps in lower floor. All feed and reflux pumps are in lower floor. Note three points of injection on two absorbers (left). These injection points enter 20, 30, and 40 trays. This is one of the first times this flexibility has been available in actual practice. There has always been a question as to how efficient trays would be in excess of the thirtieth. Experimental work is now in progress at this plant





Outside view of power plant showing short boiler stacks made possible by forced-draft fans. Connections going into side are water connections to and from turbogenerator condensers

The clearance pocket arrangement allows complete load balance throughout the plant through all compressors.

Gas Route From Intake to Residue

The gas discharge from the first stage of the compressors passes through water-cooled open cooling sections and accumulators, and is similarly cooled after each successive stage until it is discharged from the third stage through cooling sections to the absorbers at 700 psig., where it is brought in contact with absorber oil and stripped of condensable hydrocarbons.

Upon leaving the absorbers, the gas is taken into the fourth-stage suction of the three high-pressure units. Between the fourth and fifth stages from 6 to 9 million cubic feet of gas at approximately 1,600 psi., can be routed to the residue discharge line where it goes out to the field for use in gas-lift operations. The unused remainder is taken into the fifth stage of the units where it is compressed to anywhere from 3,500 psi. up to a maximum of 5,000 psi. and delivered to input wells, where it is stored in a water sand for future use.

(Below, top) Inside view of power plant showing three 750-kw. 440-volt turbogenerators. Generators are totally enclosed, with built-in air coolers. Steam condensers are mounted on platform above. (Bottom) Inside view of electric generator control and distribution panel board

The Oil Circuit

Starting from the discharge of the main lean-oil pumps, the cooled oil is delivered over the two high-pressure absorbers at about 750 psi. by an electric motor-driven centrifugal pump. The saturated oil out of the absorbers is flashed in a vent tank at about 250 psig., and the flashed gases pass to a reabsorber operating at 185 psig. To this stream of gas is added the incondensable gases from the primary still accumulator.

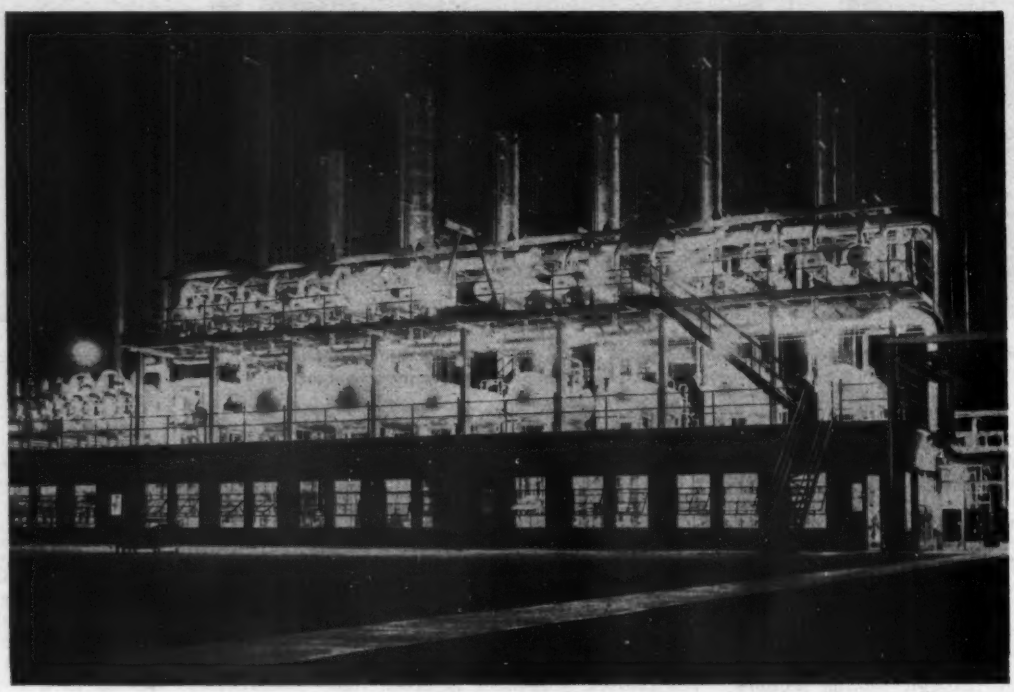
The reabsorber is supplied with lean oil at a pressure of about 250 psig. from a side tap near the middle stage of the high-pressure lean-oil pump. An external intercooler is provided to remove the heat of absorption from the partially saturated oil in the reabsorber at a point a few plates above the gas inlet.

The fat oil stream from the flash tank is joined by the fat oil pumped from the base of the reabsorber, and the combined stream enters the heat exchanger, where its temperature is raised to about 350° F. by absorbing heat from the lean oil leaving the main still. The fat oil is further heated to about 430° F. by a stream preheater, and then passes into the primary still.

The primary still, operating at about 200 psig., removes most of the light materials down to butane as an overhead product. The partially stripped fat oil then passes to the main still, operating at about 10 psig. with a feed temperature of about 410° F. Here the rest of the absorbed materials are removed as a stable overhead product.

Stripped lean oil from the base of the main still is pumped through the lean oil side of the main oil exchanger, and on through the lean-oil coolers to the suction of the main high-pressure lean-oil pumps, thus closing the oil circuit.

Surge capacity in the oil circuit is



ANOTHER EXAMPLE OF CENTRALIZED RESPONSIBILITY

The recently completed plant in the Hastings, Texas Field for Stanolind Oil & Gas Company was designed, engineered, and constructed thru-out by Stearns-Roger personnel.

Stearns-Roger

THE STEARNS-ROGER MFG. CO. DENVER, COLORADO

One side of the instrument panel in the process-control room. All instruments have individual name plates as well as unit designation, such as absorber, reabsorber, primary still, etc.

provided in the form of a large insulated horizontal tank, connected top and bottom to the lower part of the main still shell, and elevated enough to provide good suction conditions for the hot-lean-oil pump.

Between the primary and main still a stream is taken off to the oil reclamation unit where lubricating oil or other foreign substances are removed.

Representative pressures on processing equipment:

	Psig.
Absorber	690
Reabsorber	190
Main still	18
Primary stripper	195
Deethanizer	450
Debutanizer	120
Depropanizer	225
Depentanizer	65
Splitter, cutting iso from normal pentane	30
Splitter, cutting iso from normal butane	85

Fractionation

The lighter absorbed hydrocarbons such as ethane and propane are removed from the saturated oil in the primary stripper overhead, and these products are condensed and fed to the deethanizer. The overhead products from the main still are fed to the debutanizer.

The deethanizer, fed by the overhead products of the primary stripper, removes ethane and methane from the liquid stream, with minimum loss of propane. The bottom products from the deethanizer, containing only propane and heavier, combine with the overhead products from the main still to supply feed to the debutanizer. In the debutanizer both propane and butanes are taken off overhead. The bottoms go to the stock tanks as natural gasoline. The combined propane-butane is taken to the depropanizer for separation with the propane going direct to stock tanks, and the butanes going either to stock tanks or to the splitter.

In case it is desired to make isopentane, the bottoms from the debutanizer are passed through the depentanizer where the pentanes are taken off overhead, and are fed to the splitter, where isopentane is removed and sent to storage. From storage all products may be loaded to either railway tank cars or transport trucks.

Plant Features

The power plant, consisting of three Babcock & Wilcox boilers, each of which can deliver 30,000 lb. of steam per hour at 400 psig., with superheat at 640°, supplies steam for the turbo generators, the processing units, and for the turbo pumps which provide cooling-water for the compressors.

The boilers are fully automatic, being equipped with gas, water, and draft controls which are actuated by

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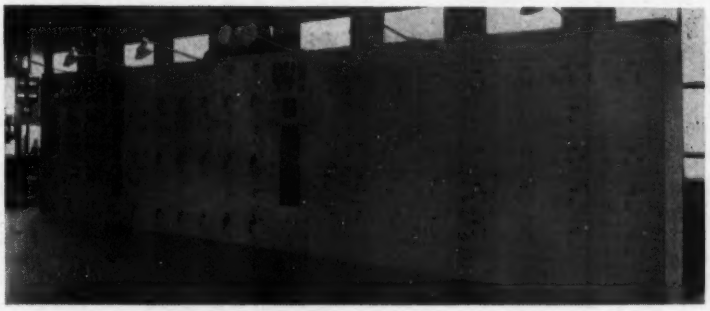
GASOLINE PLANTS

Stanolind's Hastings Plant

ELECTRICAL EQUIPMENT

Nelson Class 722 Switchboard



Designed and built by the Stearns-Roger Manufacturing Company, this new gasoline plant in the Hastings Field, introduces a number of outstanding engineering features.

For example, the above photograph shows the Nelson Class 722 Air-Break Draw-Out Equipment on the generator switchboard and distribution center which is installed in the plant. Included as part of this switchboard is the Nelson Class 1035 Centralized Motor Control Center.

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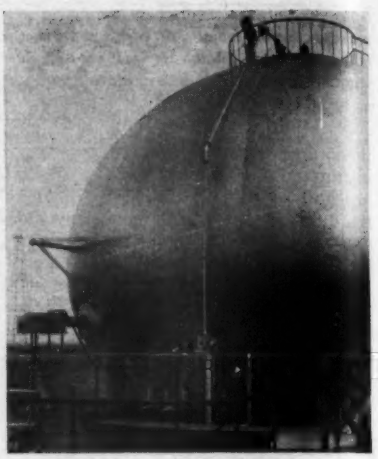
a Bailey automatic control system. This system, in addition to normal control, provides a number of safety features. If fuel-gas pressure goes down below a predetermined operating point it shuts the gas off, and it cannot be manually turned back on until the pressure has been raised slightly above the predetermined operating point. This prevents back flash or fire-box explosion in cases of leakage or should the fire be drawn out by draft. Similarly, fuel gas is shut off upon departure from normal draft conditions, or failure of feed-water supply.

Electric power for operating pumps, miscellaneous small compressors, office air-conditioning system, and all lighting, is produced by two 750-kw.-440 volt, 3-phase, 60-cycle full condensing steam turbo-generator sets, and a third set is for a spare.

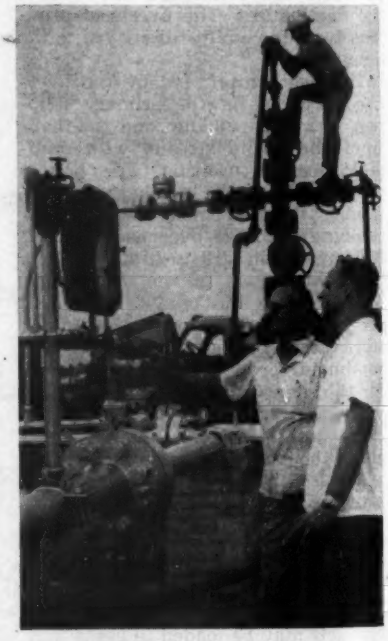
The compressor engines are cooled by an enclosed water-circulating system designed to carry a fixed inlet and outlet jacket-water temperature. The jacket water is cooled by exchanging heat to raw cooling-tower water through closed tube-bundle-and-shell coolers. The engines have individual lub-oil coolers and filters.

Gas returned to the field for gas lift is completely dehydrated in a solid adsorbent-type dehydration unit. This detail is necessary in order to prevent freeze-offs from hydrate formation, especially at wells where the 1,600 psi. supply pressure is reduced. The final high-pressure injection gas is simply discharged direct to the storage wells without cooling.

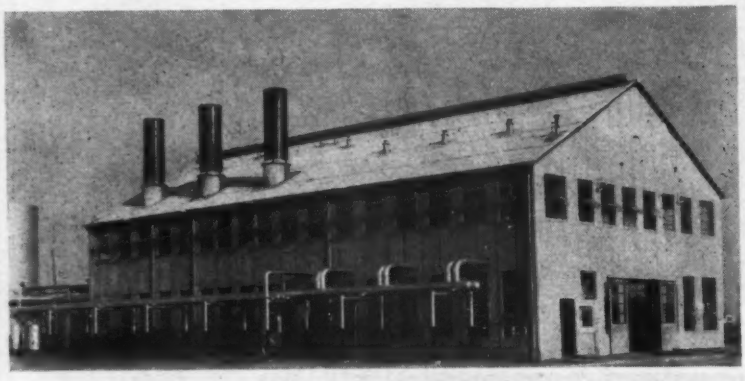
The Hastings plant was engineered and built by Stearns-Roger Manufacturing Co., in cooperation with staff of Stanolind Oil & Gas Co.



View of a gasoline-storage tank at Hastings showing agitator which prevents any possible stratification. Tank has 200,000 gal. capacity



B. L. Turner Injection Well No. 1 being acidized with 2,000 gal. Approximately 15 million cubic feet per day of residue gas from the plant is being stored in this well. Storage horizon is a water sand from 6,550 to 6,700 ft. This well has been taking gas at a pressure of approximately 3,500 psi. Water sand contains some lime and later reports showed that intake pressure was reduced to 3,000 psi. by acid job. Standing left to right observing pressures on meter are Charley Ward, Stanolind gasoline department, and G. S. Dietz, Stanolind's chief district production engineer



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Pan American to Use Pressure Maintenance, Wide Spacing in Gulf Coast Field

PAN AMERICAN PRODUCTION CO. is installing a new pressure-maintenance and stabilization plant in Olive field (80 miles northeast of Houston), Hardin County, Texas, which is of unusual engineering significance from the standpoint of new small fields. The application appears to be particularly appropriate to pools which have good sand continuity and a high order of intrareservoir communication, since wide well spacing can be coupled with the pressure-maintenance procedure.

At Olive, these three technical features are unusual to the installation: (1) The pool is small and has a limited producing capacity, yet is comparatively deep; (2) the plant has a low initial cost and high salvage value; (3) the development program uses very wide well spacing.

Announcement of the new pressure-maintenance project is made by E. R. Turner, president of Pan American. G. G. Kingelin is chief engineer for Pan American and has been prominent in handling the plans for this new type of production operation.

Olive field, a recent discovery, is a small, high-pressure pool. Full development by the drilling and completion of only five wells, spaced approximately 3,000 ft. apart, was possible because of the apparent satisfactory continuity of the sand, and the extremely low viscosity of the reservoir fluid. The oil is being produced from an abnormally high-pressure sand reservoir at a depth of approximately 10,000 ft.

Details of New Project

Studies of bottom-hole fluid samples indicate that originally the reservoir fluid was in an undersaturated state under pressure of 6,300 psi. and temperature of 250° F. The fluid is characterized by a gas-oil ratio of about 5,000 cu. ft. per barrel, and an extremely high shrinkage factor. These and other conditions indicated the desirability of reinjecting the produced gas and stabilizing the liquid in order to increase the efficiency of recovery.

Further study by Pan American suggested that the maximum economic recovery from this particular field could be obtained by pressure maintenance of the reservoir and stabilization of the liquid. Injection of the gas into the producing reservoir will serve the twofold purpose of increasing the reservoir efficiency and conserving the produced gas by storing it and making it available for future use.

The new plant will have two gas-engine-driven compressors totaling 500 hp. The 200-hp., two-stage compressor will pick up gas from a 1,000-psi. suction line for compression to 5,000 psi. The 300-hp., three-stage compressor will pick up gas from a 400-psi. suction line for compression to 5,000 psi. for discharge into a common high-pressure line for injection into well No. 1 located on the crest of the structure.

General flow of the Olive operation provides for the effluent from the four producing wells to pass through a two-stage separation process. Gases from this separation are taken into the compressors through the high and low-pressure suction lines for the compression to 5,000 psi. and reinjection into the producing formation. Liquid from the second-stage separator is fed into a stabilizer column from where the stabilized bottom liquid is passed on into conventional storage. Stabilizer vent gases are picked up by the low-pressure compressor system and compressed to 5,000 psi. for reinjection.

Modern safety controls and regulating equipment are being incorporated in the entire plant for maximum safety and ease of operation.

A unique feature to be used is the cooling of all compressor jacket water, gases, and hydrocarbon liquids by motor-driven fan-type coolers thus eliminating the conventional necessity for a water supply and cooling tower. The only steam in the entire plant is that required in the stabilizer reboiler, which is operated on a completely closed cycle using a special high-pressure water-tube boiler.

X-Ray Speeds Chemical Comparisions

ECONOMICAL and rapid means of making chemical comparisons is provided by a new instrument known as the X-ray photometer. With this device it has been found possible to determine satisfactorily the tetraethyl lead content of gasoline, the concentration of an acid in water, the per cent chlorination of a substance, etc. These determinations are made by measuring and comparing the X-ray absorption of a sample and a reference.

Essentially the device as it has been developed by engineers of General Electric Co., consists of a source of X-rays, a fluorescent screen, and multiplier phototube, an amplifier, and an indicating instrument. The X-ray beam is interrupted by a synchronous motor-driven chopper in such a way that half of the beam passes alternately through each of two analyzer cells, one containing the reference and the other containing the sample. In the half of the beam passing through the reference there is placed also an aluminum attenuator disk, the angular position of which corresponds with a particular thickness of metal.

X-rays from the two halves of the beam are received alternately on the fluorescent screen, from which the fluorescence is transmitted to the multiplier phototube. Output of this tube passes through an amplifier to a peak comparator where it registers on a microammeter as a d.c. signal indicative of the difference in intensities of the two halves of the beam.

If the sample and the reference are identical the intensities of the two halves of the beam as received on the fluorescent screen are equal and the ammeter reading is zero without the use of the attenuator. If the sample and the reference are different it becomes necessary to introduce aluminum by means of the attenuator until the two halves of the beam become of equal intensity and the reading returns to zero. From the thickness of aluminum introduced into the reference half of the beam it is possible to determine empirically the proportion of certain elements in the sample as compared with the reference. In general, the method is most applicable where there is a considerable difference in atomic numbers of the main substances to be measured.

In actual operation the X-ray photometer has been found to work satisfactorily up to a speed of 6 samples per hour. Under most circumstances the limiting factor has been found to be the time required for the preparation of the sample. Liquids, which must be measured as they are put into the analyzer cell, require more time than solids when the latter are specimens of uniform thickness.

An outstanding advantage of this method of comparison is that it is independent of the physical state of the substance being tested, because the amount of X-ray absorption by a given mass of material is always the same, whether the material is hot or cold, gaseous, liquid, or solid.

Drilling Stresses Present In Cable-Tool Drilling

(Continued from page 80)

mometer will record two or more modifications of the same disturbance. If we assume that a drill operates at a uniform speed of 37½ s.p.m., at all depths, that the tools strike at the bottom of the downstroke of the beam, and that the velocity of the wave in the drilling line is 16,500 ft. per second, we can compute the approximate position of the peaks.

Measuring the time from the beginning of the upstroke of the beam, the position of the peaks, based on uniform circular motion, are given in the tabulation (Table 1). These positions were confirmed approximately by the dynamometer cards taken in Michigan.

TABLE 1

Depth, ft.	Peaks in seconds measured from beginning of the up-stroke		
	First	Second	Third
1,000	0.0605	0.1820	0.3075
2,000	0.1210	0.3640	0.6150
3,000	0.1815	0.5460	.....
4,000	0.2420	0.7280	.....

It is this transient vibration which causes the characteristic noise of the cable-tool drill whenever an unspliced steel cable is used. It is a common observation that this noise is louder when a high or tight hitch is used. This is because the tension in the cable at the instant of impact is increased by a tight or high hitch, which raises the frequencies of the individual vibrations that combine to produce the traveling wave, which, in turn, raises the pitch.

As the noise is the result of a complex vibration, it is muffled in a wet hole. On this account, there seems to be a tendency for some drillers to drill tighter in a wet hole than in a dry hole.

An actual comparison was made between the drilling speeds of a loose and a tight hitch in a lime formation, which was believed to have relatively uniform drilling characteristics. The loose or low hitch drilled 65 per cent faster than the tight or high hitch This accounts, in part, for the relatively poor performance of the cable or churn drill in wet-hole drilling, and is a phase of the problem worth further investigation.

As has been mentioned, this disturbance is suppressed by the reduction in tension in the drilling cable at the beginning of the downstroke. The sound will disappear entirely in deep drilling, if the blows per minute are increased, as is evident from the dynamometer cards of Fig. 1. This is due to the fact that the traveling wave, having a finite velocity, does not have time to travel the length of the line three times—up to the clamp, down to the socket, and back up to the clamp. The average driller then concludes that his tools have ceased to move, although a dynamometer might well produce a card with considerable area. One can reasonably expect a dynamometer card of the cable drill, taken under conditions where the tool would have but slight movement, to resemble the card of the sucker-rod pump when the plunger is sanded up and stuck—just two parallel sloping lines with no appreciable area. The area of the dynamometer card should be considerable when the tools are moving, but the noise has disappeared on account of the depth and increased blows per minute.

The present necessity for maintaining the signals from the tools is one of two factors that force the low blows per minute onto the cable-tool drill at the present time. This situation could well be changed over night, if the hitch were made and maintained by means of a dynamometer, and this aspect of the problem is worthy of further investigation

Another important concept is that the traveling wave is reflected by the rope sockets. Other factors in practical drilling may react in the same way. For instance, a musician changes the pitch of his strings by pressing them against the neck of his instrument. It is very possible that the drilling cable, being pressed against the wall of a crooked hole by the very considerable weight of the cable and tools, reflects the traveling wave and prevents it from reaching the surface. This would give the impression that the tools have stopped moving, although a dynamometer card might show an area indicative of considerable motion. It would be a good bet that the tools are moving under the majority of conditions, only the signal has been lost. This contention is supported by the fact that deflected holes are being successfully pumped with sucker rods along the California coast.

It will be obvious to readers that these transient vibrations can be very destructive to a drilling cable, especially when a driller favors a high or tight hitch. This disturbance is undoubtedly, the major cause of premature stranding or wickering at the drilling cable, assuming that the sheaves are the customary size and in good condition.

The available evidence is that these traveling waves will not pass a splice, and this points to a possible practical means for protecting the greater part of the length of the drilling cable. Cutting off the bottom 300 or 400 ft. of the cable and splicing it back onto the main part of the cable may well serve to confine these destructive forces to such a false cracker.

Acknowledgment

The author acknowledges with gratitude the courtesy of an oil company, which wishes to remain anonymous, and International Derrick & Equipment Co and Star Drilling Machine Co. for making available these hitherto unpublished data on which this study has been based.

Gravel-Packing

(Continued from page 81)

pump (see Fig. 1) is used to force the gravel, mixed in a fluid stream, away at pump pressures. It contains either two or three cylinders of 5-cu. ft. capacity which are used to measure the gravel into the fluid stream.

The circulation joint, shown in the operating position in Fig. 2, consists essentially of two concentric tubular pieces. On the outside in the center of the tool is a swab rubber which opens downward. Below this swab rubber are ports opening into the annular space between the two tubular sections of the circulation joint. Above the swab rubber are ports which are open only to the inside tubular section of the tool. In operation, gravel-laden fluid passes downward through the annular space and out the ports below the swab rubber, while the returning fluid passes upward through the inside tubular section and out the ports above the swab rubber.

Packing Technique

The method of the circulated gravel pack consists essentially of controlled circulation, which enables an operator to circulate the gravel into the desired position between the wall of the hole and the liner. The method as used at Huntington Beach proceeds along the following lines.

A well is drilled through the lower producing zone, thus penetrating the two producing zones and the intermediate shale and water sand. A sleeve is then spotted opposite the entire length of the shale section and cemented in place. (In some wells in the field, the sleeve has been extended on to the bottom of the hole with a section of drillable pipe. This procedure simplifies the setting of the sleeve in the proper place.

After the sleeve has been cemented in place, a water string of 8⅝-in. casing is run in the well to the top of the first oil zone and cemented in place. This leaves only two sections of the hole open, the upper and lower producing intervals. The remainder of the hole is protected above the first oil zone by the water string and throughout the section between the two oil zones by the sleeve.

When the cement has set, the hole is reamed out to a 14 or 16-in. diameter opposite the oil zones. The top section is reamed first and then the bottom. The well is then ready to be gravel packed.

Perforated liner is first run into the hole, with centralizers on each joint to retain pipe in the proper vertical position while gravel packing. The

top joints, or overlap, of the liner are blank and extend well up into the sleeve. The top of the upper joint of blank pipe has internal left-hand threads to permit backing off of the circulation joint after completion of the packing. The outside top of this blank joint is also machined to permit a press fitting of the lead seal adaptor after completion of the job. Fins are generally welded on this joint to center the liner in the sleeve.

A tail pipe is run inside the liner to within a few feet of the bottom. The tail pipe is hung on the bottom of the circulation tool and acts as an extension of the inside tubular piece of the tool. The circulation joint itself makes up on the left-hand internal threads of the liner. Drill pipe or tubing is made up on the top of the circulation joint and extends to the surface.

With the entire string made up of the liner, circulation joint, and drill pipe or tubing in the hole and the liner hung about 1 ft. off the bottom of the hole, circulation is started. Once the fluid, usually drilling mud, has started to circulate and pressures are noted, the gravel is introduced into the fluid stream at the surface. The gravel-laden fluid passes down the drill pipe into the circulation joint, thence out the ports below the swab rubber and into the annular space between the wall of the hole and the liner. The fluid which carries the gravel passes through the perforations into the liner and thence into the tail pipe through which it flows out the ports above the swab rubber and returns to the surface through the annular space between the drill pipe and the water string.

When the gravel has filled up to the shoe of the sleeve and the blank liner starts to pack, a definite pressure rise is noted, indicating that the packing has been completed. This pressure rise is due to the fact that the fluid must then be pumped downward through several feet of gravel before it can reach the perforated sections and flow inside the liner. Approximately 30 to 100 ft. of the blank pipe generally is gravel packed to allow for the settling of the gravel.

After the packing of the lower zone is completed, the circulation tool is backed off and a round trip made to set a bottom lead seal adapter over the top of the liner as shown in Fig. 3. The upper zone is then packed in the same manner, with the perforated liner extending upward from the top of the lead seal adapter. After the entire packing operation has been finished, a drive-down adapter is set on top of the water string and the well completed by washing with salt water.

A variation of the above-described procedure of packing is sometimes used at Huntington Beach. This consists of extending the liner upward completely through the sleeve and upper producing zone into the water string. Both producing zones may then be gravel packed as a single zone in one operation. When this procedure is followed, it is completed with lead seal adapters and washing with salt water in the same manner as when the zones are packed in two stages.

Recent Developments in Cycloversion Process

(Continued from page 93)

tained by cracking the virgin gas oil. This reduction in octane rating can be expected in view of the high carbon deposition obtained with the cracked gas-oil charge stock.

The catalytic gas oil from the two-pass treatment, representing approximately 22 per cent of the original deasphalted topped crude, has been reduced in gravity by about two units below that of the deasphalted topped-crude charge stock while the end point of this residual cracked stock is well below the initial boiling point of the deasphalted topped crude charged to the unit.

Utilization of the catalytic gas oil will, of course, depend upon the particular requirements of a refinery for gasoline, distillate, and fuel-oil production. The entire yield of catalytic gas oil may be utilized as distillate fuels and fuel oil; it may be cycled to extinction if gasoline is the primary requirement; only the higher-boiling catalytic gas oil may be further cracked if both gasoline and distillate fuels are the principal products of the refinery. Since the deasphalted oil can be cracked at a temperature level approximately 100° below that required for equivalent conversion of light virgin gas oil, segregation of the reduced crude into a light oil and a heavy-oil charge stock will permit selection of cracking conditions most nearly optimum for each stock. The catalytic gas oil from the heavy-oil unit, being similar to light virgin oil in refractoriness, can then advantageously be cracked along with the light virgin gas oil since cracking conditions for these two stocks are quite similar.

TABLE 6—INSPECTION TESTS ON PANHANDLE CHARGE STOCKS

	Deasphalted topped crude	Catalytic gas oil from deasphalted topped crude		Virgin gas oil
Destillation, °F. (corrected to 760 mm. Hg.)	Vacuum	Vacuum	A.S.T.M.	A.S.T.M.
First drop	790	450	448	458
5 per cent over	915	474	474	527
10 per cent	940	492	491	553
20 per cent	970	520	512	583
30 per cent	1,000	559	538	602
40 per cent	1,030	601	572	621
50 per cent	1,070	652	617	640
60 per cent	1,110	693	661	660
70 per cent	....	747	707	681
80 per cent	....	811	725	...
90 per cent	....	847	...	...
95 per cent	....	869	...	...
End point	....	900	729	702
Recovery, per cent	60	99	97	97
Gravity, °A.P.I.	24.9	30.0	...	35.2
Pour point, °F.	110	65	...	65
Carbon residue (Ramsbottom)	1.84	0.15	...	0.02
Sulfur, wt. per cent	0.39	0.25	...	0.31

TABLE 7—COMPARISON OF CATALYTIC GAS OIL AND VIRGIN GAS OIL
(30-lb. operating pressure)

Charge stock—	Catalytic gas oil from deasphalted topped crude		Virgin gas oil	
Yield, per cent of charge:				
10-lb. gasoline (without poly), vol.	34.2		35.2	
10-lb. gasoline (with poly), vol.	37.1		39.6	
Outside butane required, vol.	0.9		0.9	
Propane, vol.	2.4		2.5	
C_2 and lighter, wt.	5.8		4.8	
Carbon, wt.	5.3		2.0	
Conversion, vol.	47		46	
Product inspection:	Catalytic gas oil	Debutanized gasoline	Catalytic gas oil	Debutanized gasoline
A.S.T.M. octane No.:				
0 ml. TEL	...	78.0	...	79.5
1 ml. TEL	...	79.8	...	81.9
Research octane No.:				
0 ml. TEL	...	88.6	...	93.0
1 ml. TEL	...	91.8	...	95.5
Bromine number	...	80	...	93
R.v.p.	...	5.65	...	6.0
Gravity	23.4	58.6	32.7	58.7
A.S.T.M. distillation:				
10 per cent	470	143	512	143
50 per cent	545	234	587	220
90 per cent	704	366	690	354
End point	...	406	...	398
Pour point, °F.	35	...	30	...

The first laboratory of Southwest Research is located at Essar Ranch near San Antonio. It is functionally designed and equipped with modern instruments and laboratory facilities. The second unit, devoted specifically to petroleum research, will be constructed in Houston

Southwest Research Institute Newest Member Of Slick Foundation

by George Weber

TOM SLICK © Bachrach *W. M. HAMMOND*

Slick is founder of Southwest Research and an active oil operator. Hammond is acting director and business manager of the institute

SAN ANTONIO.—The petroleum industry will receive an important share of the services of the Southwest Research Institute, recently established near this city. The newest of three nonprofit scientific organizations endowed by Tom Slick and other trustees of the estate of his father, the late Tom Slick, Sr., the institute was founded to provide technological aid to all southwestern industry. As such it will serve that region in the same capacity that the Armour Foundation, Midwest Research Institute, and Mellon Institute are serving industries of the Midwest and East.

The Slick research group, whose endowment derives largely from oil income, forms a unique combination. It comprises three separate units, each supplementing the work of the others to embrace a wide range of factual investigation dealing in pure research, industrial and agricultural research, patent development, and manufacturing and marketing studies. The principal unit of the group is the Foundation of Applied Research whose long-range program of selected basic studies represents the ultimate purpose for which the entire research structure was conceived. Southwest Research Institute and the Institute of Inventive Research will serve industry more directly by dealing in specific projects and problems assigned them by companies, individuals, and associations. Once well established the latter two organizations will realize financial incomes from fees and shares of patent royalties. This income is expected to augment endowment support and contribute in time to the continuation of work at the foundation. Since no profits will be withdrawn from the group, its units will continue to expand in proportion to their success in serving industrial clients. The end result will be realized in benefits accruing to the general public from the basic research undertaken by the foundation.

The service department of Southwest Research Institute includes a complete machine shop with foundry, forge, tin shop, welding and heat treating equipment, cold rooms, sustained humidity rooms, a power plant and a distillation unit. A separate underground vault is provided for storage of volatile chemicals

Projects Under Way

Although all three organizations are still in their initial stages, a number of research projects are already under way. At the foundation, organized in 1940, studies are being conducted and projected in medicine, plant and animal culture, chemistry,

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Specialized New Equipment Lowers Cost Of Laying Magnolia's Products Line

by Paul Reed

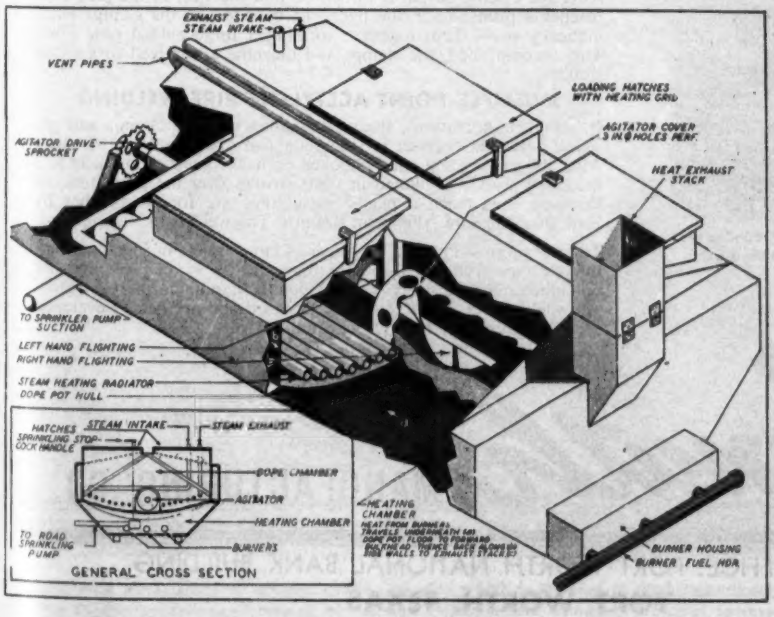
IN laying Magnolia Pipe Line Co.'s 178-mile, 12-in. products line recently completed from the Beaumont area to Hearne, Tex., the advantages of certain new types of mechanical equipment for pipe laying have been demonstrated by economical construction and steady operations of the contractor, Smith Contracting Co.. Equipment includes new self-propelled welding, air compressor, water pump, and light plant units as well as a new type of dope pot developed by O. R. Smith Manufacturing Co.

This Beaumont-Hearne line laid by Magnolia comprises the southern leg of a products pipe-line system being built this year from Beaumont via Hearne to the Dallas-Fort Worth area. The Hearne-to-Dallas and Fort Worth section consisting of 172 miles of 10-in. is now being built by Texas Pipe Line Co.

Information contained in this article was procured through a visit to the project and through data obtained from O. R. Smith and F. A. Smith, as well as through observations made on the job in the field.

The Magnolia 178-mile, 12-in. line has Grade B pipe with wall thickness of 5/16-in., 41.51 lb. per foot and

Top: F. A. Smith observing temperature of special dope processed with mechanical agitator. Above: New dope pot unit mounted on 7-ton truck powered by a 120-hp. engine.



Left: Isometric drawing of the new dope-pot unit, showing principal features

¼-in. 33.38 lb. per foot. Pipe is double coated with low-melting point coal-tar enamel supplied by Wailes Dove-Hermiston Corp. and Barrett Division, and it is wrapped with a single pass of Fiberglas. Immediately after coating and wrapping, the pipe is lowered directly into the 32 by 30-in. ditch by the procedure known as "cradling the dope in the ditch and tying down." Slack loops are left at intervals of 800 to 1,000 ft. to be lowered the morning following doping operations.

Coating material for the job, consisting of 180°-190° F. melting-point coal-tar enamel, was handled by units developed in the Smith fabricating shop. Each of these special units has

Cut your . . . . . Here's how Smith SELF-PROPELLED UNITS are doing a BETTER JOB Quicker...for less money:

Smith Self-Propelled Utility Unit shown mounted with a combination of 300-amp welder and 6-barrel dope pot for road crossing work.

Smith Full-Size Self-Agitating Dope Pot used to save time and money on recently finished 12-inch products line from Beaumont to Hearne, Texas.

Air Compressor mounted on Smith Self-Propelled trailer, 80-inch Wheel Base. Also successfully used on Beaumont Hearne pipeline.

Again O. R. Smith Manufacturing Company makes news for the entire pipeline industry with a revolutionary new method of pipeline welding. By use of Smith-designed self-propelled units and new Hydraulic Pressure Alignment Clamps, new economies are possible in man power, job time and equipment overhead. Equally important is the fact that this new welding method is adaptable to electric or acetylene operations. Here's how it works:

Electric Resistance Forge Welding

This new method of welding pipelines eliminates the use of a large crew of arc-welders and insures high-quality, uniform, forge-welded joints. One Resistance Welding Machine in combination with an alignment crew and several alignment pressure clamps is sufficient for one pipeline spread and will keep up with and overtake operations ahead of it. The steps taking place in this operation are as follows respectively: The pipe ends are cleaned and beveled to 1° bevel. Pipes are then aligned by hydraulic pressure clamps and if so desired, tack-welded. With clamp in place, Resistance Welding Machine is connected to electrode bands and automatic hydraulic pressure line. After the electric switch is turned on and the steel in the pipe ends reaches a plastic state, the hydraulic cylinders in the clamps automatically press them together, forming a forge-welded pipe joint. This accomplished, the clamps and machine are moved to another station.

MULTIPLE-POINT ACETYLENE PIPE WELDING

In acetylene operations, the pipe aligning pressure clamps and gas welding head are pre-set in stations ahead of the welding machine. After the gas welding unit is hooked on to the gas welding head and fired, the head is oscillated in short strokes over the pipe joint. As the pipe ends reach a plastic stage, they are forced together by Hydraulic Pressure Alignment Clamps. The weld is then completed.

These Hydraulic Pressure Alignment Clamps range in size to accommodate pipe from six inches to thirty inches in diameter and are manufactured exclusively by O. R. Smith Manufacturing Company. All welding units illustrated were designed and are being developed under the supervision of O. R. Smith.

O. R. Smith MANUFACTURING CO.

MAIN OFFICE: FORT WORTH NATIONAL BANK BUILDING
FORT WORTH, TEXAS

Left: Single-unit self-propelled welding machine serving one of the tack welders in the pipe gang. Right: Self-propelled air compressor

Double-unit self-propelled welding machine serving two bell-hole welders

a 20-bbl. pot transported on a 7-ton war-surplus, 6-by-6-drive truck powered with a 120-hp. Chrysler industrial engine.

For the requirements of the work, the dope is heated to 500° F. by a burner installation having five burners. However, three burners are usually sufficient to get desired results. Burner operations are served by an air compressor delivering through a volume tank at 100 lb. pressure.

The dope is circulated to prevent coking by means of a spiral-type agitator which can operate in low gear at 120 r.p.m., in second gear at 240 r.p.m., at high gear at 480 r.p.m. Circulation of hot dope from the back to the front is being modified with changes in the equipment so as to force the dope to the middle of the pot from which it will circulate. Latched lids with hydraulic packing prevent leaking. Venting is done down to the ground under the front of the pot.

Experience indicates to the Smith organization that efficiency may be increased in future operations by adopting a method for handling dope which would employ a large 60 to 80-bbl. stationary-type pot on a low-boy (to be located at successive railhead points during the course of a job) where it would be fired continuously, 24 hours per day, to furnish a constant reservoir of hot dope to replenish four or five 16 to 18-bbl. pots which will take the dope to the job in the field.

Cooling with water spray to congeal coating on pipe which is lowered in ditch immediately behind doping operations. Isometric of the new dope-pot unit, showing principal features

Special Bending Shoe

A special type of bending shoe mounted at the base of tractor A-frame was used by the pipe gang.

Power saws were used extensively in cutting the right-of-way 20 to 40 ft. wide.

Self-propelled units utilized on this project are revolutionary innovations in pipe-line construction equipment which are the answer to the question raised by O. R. Smith: "Why can't the engine in each unit be utilized to drive it not only from one job location to another along the right-of-way but also from one job to another?" Shafts, clutches, transmissions, and other driving and steering equipment were installed on each type of unit which has an engine. Consequently, every unit on the right-of-way can move under its own power while driven by its operator, completely independent of tow tractors

during normal operations. Altogether Smith Contracting Co. had 35 self-propelled units in two spreads at the completion of the Beaumont-Hearne project.

Advantages achieved by self-propelled units are regarded by the Smiths as twofold:

1. Saving in investment in equipment for moving construction units amounting to approximately $100,000 per spread. Equipment thus eliminated includes two tractors, sleds, and track wagons.

2. Over-all costs of operating a pipe-line spread are said to be reduced 50 per cent. Cost records for several projects where self-propelled units were used show that repairs were reduced 30 per cent, production was increased 30 per cent, and profits were increased 37 per cent.

Numerous Economies

In addition to lower investment, operating, and repair expenses, which are readily identified in bookkeeping records, there are numerous economies which are reflected in the over-all spread expenses. These are achieved as follows:

a. Welding machines can be driven immediately to the next joint after a weld has been completed without waiting for tow tractor. When several welders complete welds nearly simultaneously, they do not need to wait their turn for tow-tractor service. This time saving has enabled the contractor to use fewer bell-hole welders per spread.

Self-propelled welding units have been built by Smith interests of two kinds: (1) One with two welding machines mounted on a single unit; (2) the other with only one welding machine on a unit. Observations have been made of both kinds to determine which type of unit is more economical in the long run.

Advantages of eliminating delays while waiting for tow-tractor services are also to be obtained by self-propelled air compressors, 12,000-gal. per-hour water pumps, and portable light plants.

b. Savings frequently may be achieved at railroad and river crossings. To move spread equipment by means of tow tractors, trucks, low boys, etc., for resuming operations on the other side, frequently entails half a day or more delay due to shutting down and transportation.

With self-propelled units it is possible to transfer spread equipment in no more than 1½ hours in many such situations.

3. In moving from one job to another for distances up to 30 miles it has been found to be practicable to have all self-propelled units move under their own power. For longer distances, with the exception of dope pots, all self-propelled units have been moved by floats.

A further innovation of the Smith organization is a self-propelled combination utility welding outfit and small dope pot for work at tieins.

Reduction of damage to right-of-way resulting from towing sleds and wheel equipment around the units operating in construction operation has led to substantial savings to pipe-line companies in lessening liability for damage claims by land owners.

The self-propelled units have been used on three projects built by Smith Contracting Co. this year totaling 387 miles in length.

A method employed by the Smith organization for boring highway and railroad crossings utilizes a common type of punch of the kind often used for hand operations. The punch is manipulated by winch cables of two tractors: one pushes the punch into the hole; the other pulls it back. About 2 ft. of hole are cut in one trip taking 5 minutes.

The development, fabrication, and application of self-propelled pipe-line construction units by the Smith organization represents a very distinctive feature of 1947 operations which promises to have far-reaching effects in the future. These together with the special type of dope pot are part of the modern trend toward speed and flexibility which inevitably contribute to lowering construction costs.

Slick Foundation

(Continued from page 108)

biology, and chemurgy. A presently planned study which concerns petroleum is an investigation of new uses for waste flare gas.

The Institute of Inventive Research has considered to date over 600 inventions, a number of which are now approaching commercial application. Of the projects accepted to date, about 20 per cent concerned oil exploration, development, and production. The institute is organized to develop likely prospects to full use, following through the successive stages of evaluation, patent research, model and pilot-plant construction, testing, improvement, and finally, patent application and manufacturing and marketing studies. The client's patent rights are protected and the institute's share of income for its services in developing successful projects is determined by contract with the inventor.

Southwest Research

Southwest Research Institute, the largest unit of the group, will probably prove of most interest to the oil industry. It is expected that petroleum and related studies will occupy the largest single industry classification in the institute's services.

The conventional research services are offered: exploring and development of new techniques, materials, or products, solving of industrial engineering problems, reduction of manufacturing costs and discovery of new uses for byproducts and wastes. Initially petroleum industry assignments touching on exploration and production take up about one-third of the institute's attention. In 2 months it has outgrown the first laboratory unit at Essar Ranch and a specialized petroleum laboratory costing an estimated $1,000,000 is planned for Houston when materials and equipment become available. Since the work of the organization is just beginning, and the nature of the individual projects is held in strict confidence, little will be known generally of the institute's work for some time to come. It can be said, however, that one or more studies of considerable importance are under way, on a long-term investigation basis.

Unlike the other two units, which are endowed from the Slick Estate, Southwest Research is financed personally by Tom Slick whose plans for such an organization date back several years. The institute's board of governors represents a cross-section of Southwest industry. Included are well-known names in the oil industry; George Strake of Houston, James Hewgley of Tulsa, and C. F. Urschel and Dr. Judson S. Swearingen of San Antonio.

The beginning staff of the institute includes: acting director and business manager W. M. Hammond, formerly business manager for Armour Foundation; Dr. H. C. Dyme, chemist and bacteriologist; Dr. John B. Loefer, biologist; Robinson Brown, mechanical engineer and specialist in oil-well-drilling equipment; Dr. Swearingen, chemical engineer and specialist in hydraulics and turbines; Dr. Paul A. Keesee, veterinarian; Dr. F. W. Bieberdorf, botanist; I. O. Gilbert, specialist in electronics and machine design, and their assistants.

The institute will assist deserving students of science by employing a limited number as assistants to staff technologists. Latin-American students will also study and assist in research work at the institute, particularly in the fields of agriculture and livestock breeding.

106,000 Acres of Swenson Ranch Is Leased in Texas

Cities Service Oil Co. and Sinclair Prairie Oil Co. have obtained a 106,000-acre oil and gas lease on Swenson Land & Cattle Co.'s SMS Ranch in Throckmorton, Haskell, and Baylor counties in Texas. Nearly 91,000 acres are in Throckmorton County.

An intensive exploration program is being planned for this area which in the past year or more has been the scene of active wildcat operations. Recently developed production is coming mainly from the Caddo and Mississippi limes.

New Gulf Oil Plant in West Texas

(Continued from page 97)

From the two contactors, wet glycol passes to a vertical separator where entrained gas is stripped, thence to a rag-packed filter for sludge removal. After preheating, the liquid is charged to a 3 by 16-ft. vertical still which is equipped with a thermostatically controlled direct-fired heater. Water vapor passes overhead to atmosphere and the dry glycol after heat exchange with the incoming wet liquid stream is pumped to the combination settling and suction tank. A reciprocating, motor-driven proportioning pump takes suction from the tank and moves the agent via atmospheric-type coolers, to the contactors.

The atmospheric-type cooling tower handles the full load of the plant's compressor and process cooling. The cooling-water system is served by three pumps installed in one end of the compressor building. One handles water for the oil coolers, and another the closed water system for compressor and power cylinders. The third pump, a standby, can substitute for either of the other two. Where water lines must be buried, they comprise cement-asbestos pipe since soil corrosion of iron pipe in the area is especially severe.

Due to the prevalence of dust in the area, oil-bath air cleaners are particularly important. They are placed outside the compressor building and equipped with the customary back-fire relief valves.

The plant is protected by a modern safety system. On the compressor bank, automatic shutdown devices interrupt operation in case of engine overspeed or overheating due to failure of cooling water or lubricating-oil circulation. A central manual switch in the plant office shuts down the entire station in an emergency.

Fire protection for the entire station is provided by an asbestos cement pipe system comprising risers with 50-ft. hoses and fog nozzles. Additional protection is afforded by a number of 75-lb. CO_2 extinguishers posted about the plant.

In its first year of operation the plant has compressed 2,696,310 M.c.f. used for gas lift, and 73,438 M.c.f. for pressure maintenance. Operation began with a daily throughput of 8,000 M.c.f. all of which was used for gas lift. At present the gas-lift program takes 6,786 M.c.f. for 172 wells in the field, and 683 M.c.f. is being injected to the reservoir daily.

The plant was designed and constructed under the supervision of J. R. Sherman, engineer in the company's gas-gasoline department, and constructed by W. H. Bowden, of Odessa, Tex., who was contractor-engineer for the plant and field system.

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QUESTIONS on TECHNOLOGY

by W. L. Nelson

Consulting Engineer

Octane Number of Reformed Naphthas

Little information is available about the yields and octane numbers obtained in thermal reforming. Can you give us formulas on this?—F. R. C.

Fig. 1 indicates the general relationship of octane number of charge stock, increase in octane number, and yield (or loss). It is based on somewhat limited data (34 tests) reported in the literature (References 1, 2, and 3). The relationship in Fig. 1 is awkward, but it retains the useful concept of "degradation" introduced by LeRoi and Ferguson (Reference 4). This is defined as the decrease in percentage yield for an increase in one of the octane number. In deriving Fig. 1, it was assumed that only gasoline and gas are produced by reforming, in other words that the loss is 100 minus the yield.

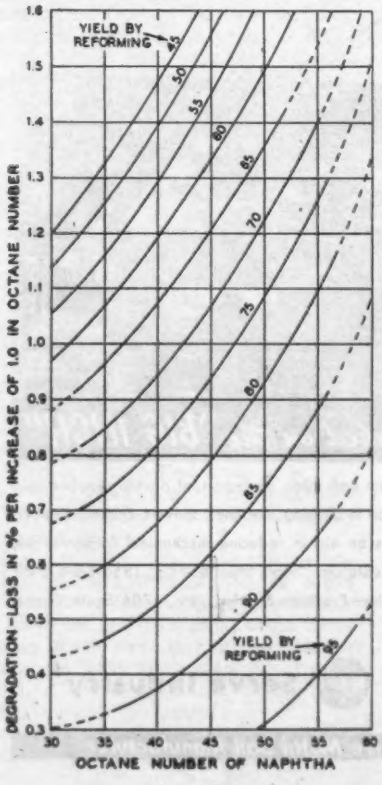
Example 1.—According to Fig. 1, the degradation of a 45-octane-number naphtha, when making a yield of 85 per cent gasoline, is 0.625. The octane number of the reformed gasoline will be higher than that of the naphtha (45 octane number) by the following number of units:

$$\frac{100 - 85}{0.625} = 24 \text{ units}$$

Thus, the octane number of the reformed gasoline will be 45 plus 24 or 69.

The accuracy of the correlation is indicated by Table 1. The greatest inaccuracy is 4.5 octane number units and for 60 per cent of the data, the accuracy is less than plus or minus 2 octane number units.

Fig. 1—Degradation as a function of octane number of charge stock and percentage yield, in thermal reforming



Larger Yields

Reforming in the presence of gases (propane and butanes), as in the polyforming process (references 5-8), results in larger yields than those indicated in Fig. 2. Most generally, the yield lines marked 80, 85, and 90 on Fig. 1, should be labeled 75, 80, and 85 when applied to polyforming. This might indicate that the polyforming process is inferior, whereas the opposite is the true situation (see Example 2). Reference 6 presents a nomographic chart for computing the octane number increase by polyforming.

TABLE 1—ACCURACY OF FIG. 1

	Octane number			
		Reformed gasoline		
Reference	Charge-stock	Experimental	Calculated	Error
1. Egloff ..	50	61	62.5	1.5
	50	75	76.6	1.6
	50	76	77.4	1.4
	37.5	79.0	76.6	2.4
	37.5	77.5	75.4	2.1
	37.5	71.0	70.3	0.7
	37.5	75.8	73.5	2.3
	52.6	71.0	72.2	1.2
	52.6	76.9	75.5	1.4
	52.6	80.0	80.1	0.1
	52.6	73.0	73.3	0.3
	52.6	79.2	77.0	2.2
	52.6	77.9	76.3	1.6
	37.6	64.8	69.3	4.5
	37.6	70.6	72.1	1.5
	37.6	76.0	75.3	0.7
	37.6	66.9	70.3	3.4
	37.6	75.6	74.4	1.2
	37.6	77.3	76.7	0.6
2. Mase	40.5	64.5	60.5	4.0
	40.5	67.0	68.5	1.5
	40.5	68.5	68.7	0.2
	40.5	70.0	69.7	0.3
	40.5	72.5	70.7	1.8
	48.5	68.0	66.2	1.8
	48.5	70.0	67.9	2.1
	48.5	72.0	69.3	2.7
	48.5	73.5	69.5	4.0
	48.5	74.5	70.1	4.4
3. Mithoff..	63.5	76.0	76.8	0.8
	48.0	73.5	71.0	2.5
	46.0	73.0	70.6	2.4
	36.0	70.0	68.7	1.3

Example 2.—Example 1 will be repeated but for polyforming. The degradation will be only 0.45 and the increase in octane number is:

$$\frac{100 - 85}{0.45} = 33.4 \text{ units}$$

The polyforming process operates at a reaction-coil pressure of 1,000-1,500 psi.

The reforming of cracked distillates is not very successful because the "degradation" is very large. LeRoi and Ferguson (Reference 4) report "degradations" for cracked distillates that are double or more the "degradations" for straightrun materials.

References

1. Egloff, G., Thermal Reforming for Olefin Production, The Oil and Gas Journal, July 29, 1944, p. 157.

2. Mase and Turner, Thermal Reforming Plus Catalytic Polymerization, W.P.R.A. meeting, Wichita, Kans., April 1, 1940.

3. Mithoff, MacPherson and Sipos, California Crude Oils, The Oil and Gas Journal, November 6, 1941, p. 81.

4. LeRoi and Ferguson, Developments in Naphtha Reforming Practice . . . 3rd Mid-Year meeting, A.P.I., Tulsa, Okla., May 1933.

5. Ostergaard and Smoley . . . High Gasoline Yield by Polyform Process, The Oil and Gas Journal, September 12, 1940, p. 52.

6. Offutt, Ostergaard, Fogle and Beuther, Naphtha Polyforming, Pet. Refiner, November 1946, p. 120.

7. Hirsh, Ostergaard and Offutt, Correlation of Operating Variables in the Polyforming Process, Pet. Refiner, November 1946, p. 136.

8. Offutt, Ostergaard, Fogle and Beuther, Naphtha Polyforming with Outside Gas, Pet. Refiner, November 1946, p. 129.

Stopping Gasoline Leaks With Soap

Gasoline leaks frequently develop in our storage drums. What can we do to stop the leaking while waiting for repairs? We have heard of using soap.—J. F. C.

Although soap can be used it is not recommended unless every precaution has been taken to avoid the leaks. Better grade, thicker metal cans should be located and they should be completely emptied, drained, and dried at frequent intervals to eliminate moisture. Heavy wall equipment should be welded or soldered at the first opportunity. However, small openings in drums, can, tanks, etc., acording to J. R. Kennedy in Power Plant Engineering, April 1947, page 93, can be plugged by rubbing ordinary laundry soap vigorously over the opening. Gasoline or diesel fuel does not dissolve the soap.

MODERN Rotary DRILLING

Steam Slush Pumps

FOR normal drilling operations and in areas where water and fuel do not represent a special problem, the characteristics of a steam slush pump make it ideal for rotary-drilling purposes. Under conditions requiring large volumes of circulation at extreme depths of drilling, the steam slush pump is, at least for the present, still the only pump capable of meeting the needed requirements.

The characteristics of the slush pump referred to above are its simplicity and flexibility. A direct-acting steam slush pump is an extremely simple piece of machinery, so designed that it can be maintained by regular drilling crews with tools available at every rotary rig. Flexibility of the pump is even more important and is its chief advantage. In contrast to the power pump, the steam slush pump automatically adjusts its speed to the pressure of the system, slowing down as the pressure increases. At the point of stalling, full steam pressure is held against the piston. The disadvantage of the pump is large steam consumption. Use of from 50 to 60 lb. of steam per horsepower-hour is sometimes used in estimates.

New Developments

While some important changes of design are in process of development, there have not been many changes made during the last few years in design of pumps actually used. The improvements have been in details of construction and in type of materials used. This is particularly true in regard to liners, pistons, piston rods, valves, and valve seats. Use of cast-steel water ends tended to hold down the weight of pumps designed for high operating pressures.

As the depth of drilling has continued to increase, the pumps have become larger and heavier, 18 by 8 by 20 and 19 by 7¾ by 22 pumps being available. The latter pump is rated at 921 hydraulic horsepower and is designed for maximum steam pressure of 350 lb. and water pressure of 3,500 lb.

Triplex steam slush pumps are being used. The advantage of such a pump is its ability to maintain high-pressure, large-volume rates of circulation. This may eliminate in many cases the need for compounding of two pumps in series or in parallel, with the resulting saving in space and amount of separate pieces of equipment which otherwise have to be moved. Another advantage is reduction of pulsation of the discharged fluid stream, resulting from overlapping of strokes in the three cylinders. One of such pumps, built in 18 by 7 by 20 size, has a theoretical displacement of 1,015 g.p.m. when used with the largest liners and at maximum speed. It is rated for maximum steam pressure of 350 psi. and maximum fluid chamber pressure of 3,000 psi. The steam end is a three-cylinder one-piece semisteel casting. The fluid chamber, cast steel consists of three separate, interchangeable cylinders.

Capacities

To illustrate range of operation of a large steam slush pump a chart is shown in Fig. 52. The chart shows characteristics of an 18 by 8 by 20 double-acting, duplex steam slush pump, for different sizes of liners and for different speeds of operation. Data are given for 325-psi. pump manifold steam.

In the same chart there is shown a group of curves marked A-A. These curves represent some of the data collected by one of the pump manufacturers during a large number of actual field tests conducted in cooperation with several operators. Wells covered by these tests ranged in depth from 4,620 to 11,534 ft. A considerable variety of drilling conditions and of drilling equipment was involved. The tests therefore may be considered as fairly representative. It should be noted that volume and pressure capacities of the pump are considerably in excess of the volume and pressure maxima of the tests.

For comparison the same data will be shown in the following installment together with performance curves of power pumps of different ratings.

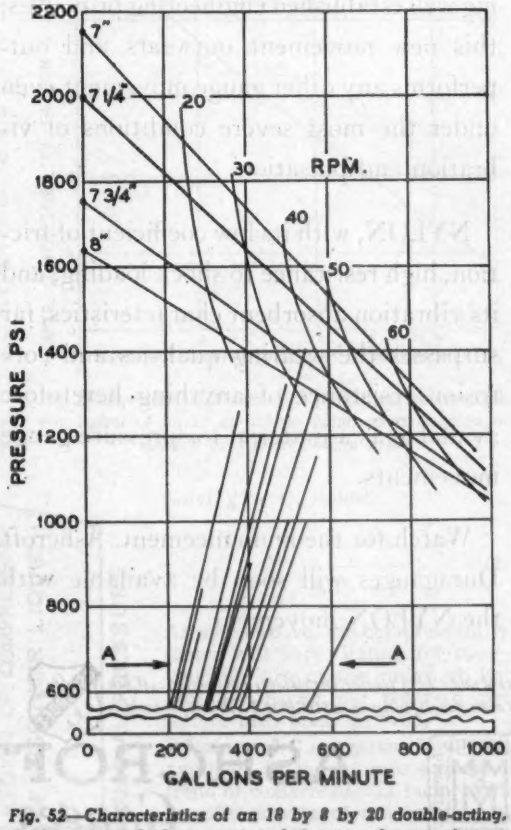


Fig. 52—Characteristics of an 18 by 8 by 20 double-acting, duplex steam slush pump, in relation to volume and pressure requirements of a representative group of field tests

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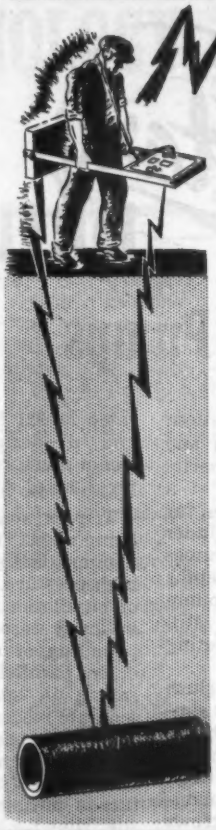

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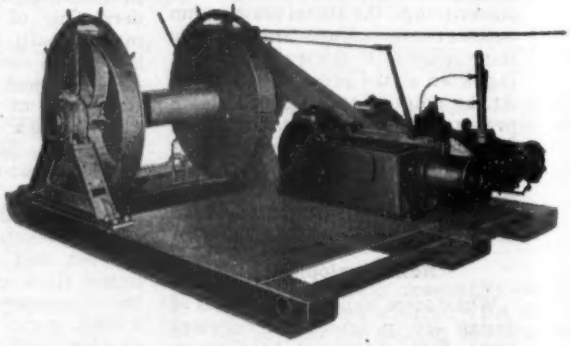

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ENGINEERING *fundamentals*

Compressibility of Reservoir Fluid Above the Bubble Point

RESERVOIR oil, above the pressure at which all available gas has gone into solution, is a liquid which has the properties of a single-phase system. In particular, further compression will decrease the total liquid volume. Hence, the formation volume factor decreases as has been shown previously by a typical curve. Therefore, a given volume of reservoir oil existing above its saturation pressure, when taken from original pressure to the pressure at which gas first appears, will undergo an expansion in volume. The magnitude of this expansion is useful in certain reservoir calculations.

The degree of compressibility of a liquid is dependent upon the type of liquid. There is no general relationship expressing the compressibility of all liquids. For a homologous series of compounds, compressibility varies more or less regularly with the variation in molecular size. This gives rise to the general observation that for oils of similar base the compressibility decreases as the specific gravity of the oil increases.

The compressibility factor is defined as the rate of change in volume with pressure increase per unit volume of liquid, all variables other than pressure being constant. In general, the compressibility factor will change with pressure. The factor is ordinarily determined empirically over a definite pressure interval by direct measurement. For the average compressibility factor over a pressure interval the following equation can be used:

$$V_2 = V_1 [1 - C (P_2 - P_1)] \quad (1)$$

where V_1 represents a volume liquid at some reference pressure P_1, V_2 represents the volume occupied by the same liquid under pressure P_2 and, therefore, a minus sign is arbitrarily used to yield C as a positive quantity.

One can consider the expansibility of a liquid under pressure release as the inverse of compressibility. According to a strict definition, the factor of expansibility is the same as that for compressibility but differing in sign. In defining an average expansibility, a different numerical value will result because of the differing volume used for a reference. Thus, for expansion the equation corresponding to Equation 1 would be:

$$V_1 = V_2 [1 + C_e (P_2 - P_1)] \quad (2)$$

where the smaller volume V_2 at the higher pressure P_2 is used as the reference. C_e differs from C by the ratio of V_1/V_2. As the limit at a definite pressure is taken, the values of C_e and C become identical.

Equation 1 can be applied to calculate the average compressibility of a reservoir oil above its saturation pressure (region of a single phase) from the plot of formation volume factor, β, versus pressure (Fig. 1). The reference pressure is chosen as P_s to P_o the relative volume change is from β_s to β_o. Substituting in Equation 1 gives:

$$\beta_o = \beta_s [1 - C (P_o - P_s)] \quad (3)$$

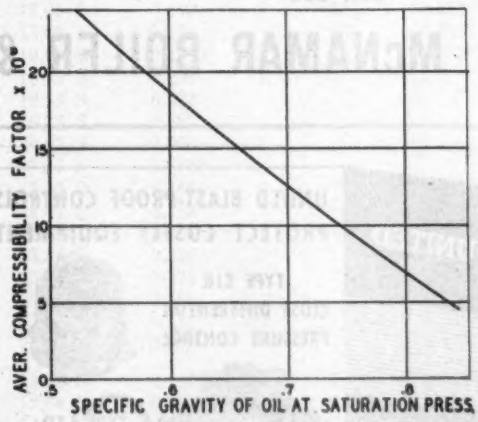

Fig. 2—Barrels compression per pound per square inch per barrel of liquid at bubble point, as a function of specific gravity at bubble point

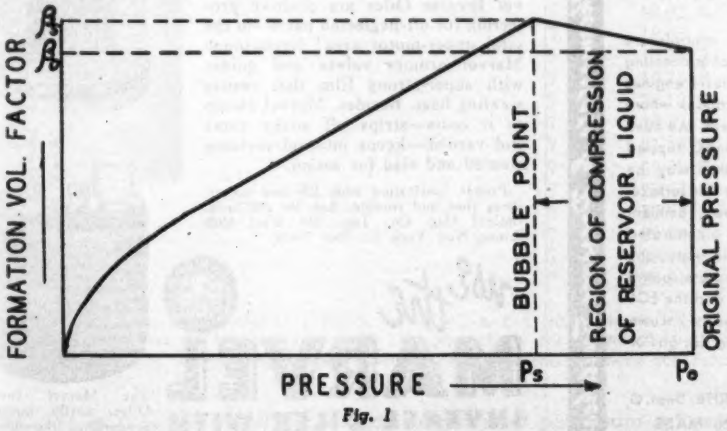

Fig. 1

Solving for C, yields:

$$C = \frac{\beta_s - \beta_o}{\beta_s (P_o - P_s)} \quad (4)$$

As noted above, the compressibility factor will vary. Values for reservoir oils are of the order of 10^{-6} bbl. per barrel per pound per square inch pressure drop.

Values of C computed from data available in the literature show a trend of compressibility factor with specific gravity of reservoir oil at its saturation pressure as shown in Fig. 2.

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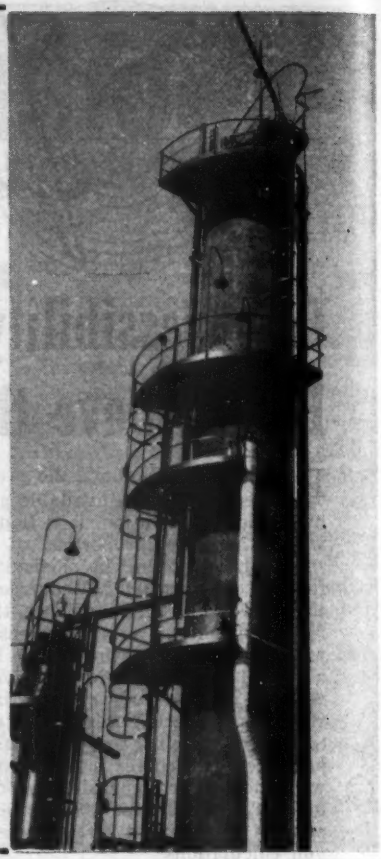

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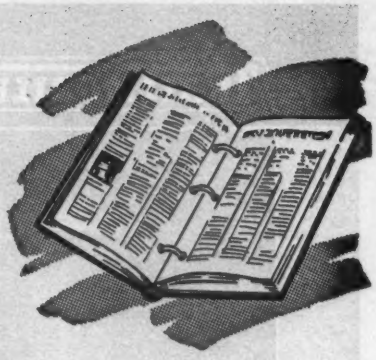

5—Pipe and Tubing Sizes

(6⅝ to 7 Inches)

Nominal pipe size (in.)	Asbestos cement pres. pipe: O.D. (in.)	I.D. (in.)	Wt. per ft. lb.	Pres. tubing: O.D. (in.)	Thickness (in.)	Line pipe: O.D. (in.)	Wt. per ft. plain ends, lb.		Thickness: In.	B.W.G. or fraction	Casing: O.D. (in.)	I.D. (in.)
6⅝	...	...	...	..	...	6⅝	11.65	L	0.169	..	6⅝	6.049
	...	...	...	..	...	6⅝	12.39	L	0.180	7	6⅝	5.989
	...	...	...	..	...	6⅝	12.66	S	0.184	..	6⅝	5.921
	...	...	...	..	...	6⅝	12.72	S	0.185	..	6⅝	5.855
	...	...	...	..	...	6⅝	12.89	L	0.1875	3/16	6⅝	5.791
	...	...	...	..	...	6⅝	13.92	S	0.203	6	6⅝	6.287
	...	...	...	..	...	6⅝	14.97	L	0.2187	7/32	6⅝	6.257
	...	...	...	..	...	6⅝	15.05	S	0.220	5	6⅝	6.255
	...	...	...	..	...	6⅝	15.91	L	0.233	..	6⅝	6.135
	...	...	...	..	...	6⅝	16.69	S	0.245	..	6⅝	6.041
	...	...	...	..	...	6⅝	17.02	L	0.250	¼	6⅝	5.913
	...	...	...	..	...	6⅝	17.61	S	0.259	3	6⅝	5.761
	...	...	...	..	...	6⅝	18.97	H	0.280	..	6⅝	5.675
	...	...	...	..	...	6⅝	19.06	S	0.2812	9/32	6⅝	5.595
	...	...	...	..	...	6⅝	19.23	S	0.284	2	...	...
	...	...	...	..	...	6⅝	19.49	S	0.288	..	...	...
	...	...	...	..	...	6⅝	19.75	S	0.292	..	...	...
	...	...	...	..	...	6⅝	20.27	S	0.300	1	...	...
	...	...	...	..	...	6⅝	21.07	S	0.3125	5/16	...	...
	...	...	...	..	...	6⅝	22.82	S	0.340	0	...	...
	...	...	...	..	...	6⅝	23.01	S	0.343	..	...	...
	...	...	...	..	...	6⅝	23.58	S	0.352	..	...	...
	...	...	...	..	...	6⅝	23.84	S	0.356	..	...	...
	...	...	...	..	...	6⅝	25.03	S	0.375	⅜	...	...
	...	...	...	..	...	6⅝	25.66	S	0.385	..	...	...
	...	...	...	..	...	6⅝	27.65	S	0.417	..	...	...
	...	...	...	..	...	6⅝	28.57	H	0.432	..	...	...
7	7.76	7.0	8.1	7	5/16	7	13.11	S	0.180	7	7	6.456
	8.04	7.0	11.4	7	¼	7	13.64	S	0.1875	3/16	7	6.398
	8.32	7.0	14.6	7	3/8	7	14.74	S	0.203	6	7	6.336
	8.66	7.0	18.9	7	7/16	7	15.84	S	0.2187	7/32	7	6.276
	...	...	...	7	½	7	15.93	S	0.220	5	7	6.214
	...	...	...	7	5/8	7	16.70	S	0.231	..	7	6.168
	...	...	...	7	¾	7	17.19	S	0.238	4	7	6.154
	...	...	...	7	1.0	7	18.02	S	0.250	¼	7	5.836
	...	...	...	..	...	7	18.65	S	0.259	3	7	6.652
	...	...	...	..	...	7	19.54	S	0.272	..	7	6.538
	...	...	...	..	...	7	19.75	S	0.275	..	7	6.450
	...	...	...	..	...	7	20.18	S	0.2812	9/32	7	6.366
	...	...	...	..	...	7	20.37	S	0.284	2	7	6.334
	...	...	...	..	...	7	21.47	S	0.300	1	7	6.184
	...	...	...	..	...	7	22.32	S	0.3125	5/16	7	6.094
	...	...	...	..	...	7	23.64	S	0.332	..	7	6.048
	...	...	...	..	...	7	23.71	S	0.333	..	7	6.004
	...	...	...	..	...	7	25.66	S	0.362	..	7	6.000
	...	...	...	..	...	7	27.73	S	0.393	..	7	5.920
	...	...	...	..	...	7	29.71	S	0.423	..	...	...

*Also available in i.d. sizes at 3, 2½, 3, 3½, 4, 4½, 5, 6, 8, 10, 12, 14, 16, 18, 20, 24, 30, and 36 in. The four weights shown above for 7-in. pipe are for pressures of 50, 100, 150, and 200 psi. Standard length is 13 ft. for sizes above 10 ft.

Notes—Refer to Refiner's Notebook 173 (December 6) for specifications and references.

No. 174 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

TRAILMOBILE WINS TWO TOP SPOTS—

IN 1947 ATA ROADEO AT LOS ANGELES!

Here is Joseph Kuttler, Vice-President of The Trailmobile Company, presenting personal radios to Charles Zimmerman of Chicago, first place winner; and to John R. Winter of Rock Island, Illinois, who finished in second place. Similar radios were presented by TRAILMOBILE to each of the 50 drivers who participated in the ROADEO.

Yes, Trailmobile has done it again. Not once, but twice in the same spot. The scene was the A.T.A. National Convention at Los Angeles, where the ROADEO for truck drivers is always highlighted.

Manufacturers of trucks and trailers line up their equipment on the field, and drivers may choose any combination of tractors and semi-trailers. Perhaps it is not mere coincidence that the two drivers who placed first and second in this great national competition chose TRAILMOBILES.

TRAILMOBILES are known the nation over as "the easy pulling trailers". Smart drivers know this, as is reflected by the choice of the two drivers who went out to win. Smart fleet operators who keep close account of their operating and maintenance costs have also discovered that TRAILMOBILES are the "easy pulling trailers".

Yes, TRAILMOBILES are the choice of champions who had the entire field to choose from.

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NATURAL GAS

Panhandle Eastern's Loop Program Opposed

WASHINGTON. — Representatives of Illinois and Michigan utilities urged the Federal Power Commission last week not to approve Panhandle Eastern Pipe Line Co.'s plans for looping of its pipe line at a cost of $23,640,000 until the company was in a position to take care of all needs of existing customers.

They told the commission the company should not be permitted to take on new customers until they could meet present requirements. Counsel for Panhandle Eastern said that under such a condition it would not be able to go ahead with its plans.

Hearing on Panhandle Hugoton Fields Delayed

AUSTIN. — The Texas Railroad Commission hearing on the Hugoton and Panhandle gas fields, originally set for November 20, will be held January 28.

The joint hearing at Amarillo will be held to consider:

Whether the Texas Hugoton area connects with Oklahoma and Kansas fields producing from similar sands.

Whether the Hugoton and Panhandle areas of Texas are connected.

Whether the Texas Hugoton wells shall be prorated.

Whether Panhandle sweet and sour gas fields should be prorated together.

Whether identical regulations shall be drawn by Texas, Oklahoma and Kansas for Hugoton field, if it is found to extend into this state.

Waynesburg Home Gas Co. To Receive "Big Inch" Gas

Authority has been granted Texas Eastern Transmission Corp. by the Federal Power Commission to make connection with and deliver 700,000 cu. ft. of gas daily to Waynesburg Home Gas Co. Deliveries are to begin as soon as connections can be established and are to continue through April 30, 1948.

Texas Eastern had established a 5,000,000 cu. ft. emergency reserve under a recent order granting the company authority to operate and make additions to the Big Inch lines.

Waynesburg Home Gas Co.'s production has been substantially reduced due to depletion of its wells. The company supplies gas for Waynesburg, Pa.

New York State Natural Seeks to Serve Peoples

New York State Natural Gas Corp. has applied to the Federal Power Commission for authorization to install and acquire connections and other facilities for the delivery of gas to Peoples Natural Gas Co. on an "if, as and when" basis.

Provisions would be made for delivery at a point near Peoples' McKeesport compressor station in Allegheny County and at a point near its Pew station in Clarion County, both in Pennsylvania. Cost of the entire projects is estimated at $20,250 and would take about 10 days.

New York State Natural said it expected to begin receiving gas from Texas Eastern Transmission Corp. this week.

A.G.A. Sponsors Heating Cost Research Project

A new cooperative research project aimed at decreasing the cost of home heating and cooling installations is starting at the engineering experiment station of the University of Illinois.

The project is sponsored by the American Gas Association. Work will be carried on in the mechanical engineering department at the university by Stanley F. Gilman, special research assistant.

Natural Gasoline

Natural Gasoline Output Shows September Gain

Production of natural gasoline and allied products increased in September to 368,000 bbl. daily, as compared to 352,000 bbl. daily for August, according to the Bureau of Mines.

Of the 368,000-bbl. total production, 268,000 bbl. represented production from natural gasoline plants and the remaining 100,000 bbl. from cycling plants.

Refinery stocks decreased 329,000 bbl., and stocks at plants and terminals decreased 231,976 bbl. Total stocks for September 1947 were the lowest since December 1945.

Perry Named Head of N.G.A.A. Program Group

Frank M. Perry, Cities Service Oil Co., Bartlesville, Okla., has been named head of the convention program committee for the twenty-seventh annual convention of the Natural Gasoline Association of America, according to an announcement by N.G.A.A. President C. R. Williams.

The theme of the meeting, which is to be held March 24-26 at the Texas Hotel, Fort Worth, will be better utilization and conservation of hydrocarbons.

Other members of the committee are: Henry M. Brown, Midland Gasoline Co., Houston; J. H. Dunn, Shamrock Oil Gas Corp., Amarillo; T. R. Goebel, Shell Oil Co., Inc., Houston; J. A. LaFortune, Warren Petroleum Corp., Tulsa; John F. Lynch, LaGloria Corp., Corpus Christi; and Albert H. Weil, United Gas Pipe Line Co., Shreveport.

Barnhart Plant Contracts Awarded Fish Engineering

Contracts exceeding $3,500,000 have been awarded to Fish Engineering Corp. of Houston for the construction of a natural-gasoline plant and a carbon-black plant for Witco Hydrocarbon Corp. in Barnhart field in Reagan County of West Texas. Construction is expected to begin in January and completed by next July.

The plants, which will utilize 12,000,000 to 15,000,000 cu. ft. of flare gas daily from 48 wells in Barnhart field, are expected to extract approximately 2,000 bbl. of natural gasoline, propane, and butane daily and about 750,000 lb. of carbon black monthly.

Surveys have been made and materials for construction ordered. The plants will be located on 80-acre sites about 2 miles apart.

W. F. McDonald, of Houston, vice president of Witco Hydrocarbon Corp., will be in charge of the plants.

The plants will use gas from wells of Amerada Petroleum Corp., General American Oil Co., Danciger Oil & Refining Co., Skelly Oil Co., and Sharples Corp.

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REFINING

Sunray Duncan Refinery Topping Unit on Stream

AN 18,000-bbl. daily topping unit went on stream December 5 in Sunray Oil Corp.'s remodeled refinery at Duncan, Okla.

Sunray acquired the refinery from War Assets Administration with a bid on the Government-owned plant of $5,100,000. Bids were opened August 4, and Sunray received title to the refinery August 18.

Sunray's original plans called for initial operation of the plant to begin early next spring. The first crude unit in the topping operation was built from available stills formerly used in the refinery's catalytic cracking process. The unit just placed in operation will produce gasoline, distillate, gas oils, and fuels from crude now coming to the plant through a new 6-in. pipe line to Velma field, in Stephens County.

F. L. Martin, vice president in charge of refining for Sunray, announced December 6 the company plans to lay an 8-in. line to connect with The Texas Co.'s pipe-line station at Velma whereby Sunray will be able to take up to 25,000 bbl. of crude oil daily.

The company, he said, will add lines to other major trunk lines to insure full continuous operation of the refinery.

Preliminary tests of the new topping unit were completed under the supervision of T. M. Lumley, president of Refinery Engineering Co., Chicago; J. C. Hobday, recently named manager of the refinery, and R. L. Johnson, refinery superintendent. *(For information on the plant's facilities and details of the WAA sale, see The Oil and Gas Journal, August 9, page 56, and August 23, page 69).*

Oil Burner Shipments Reach All-Time Record

Factory shipments of oil burners in September totaled 127,591 units, an all-time high, accordinging to the Bureau of Census, Department of Commerce. The new high was 4 per cent above the previous record made in August. Of the total number of oil burners shipped, 96 per cent were of the residential type.

Unfilled orders for oil burners now stand at 576,829 units, a decrease of 13 per cent from the previous month's figure, according to reports submitted by 163 oil burner manufacturers.

Utility Power Plants Increasing Fuel Oil Use

Fuel oil consumed during October by electric utility power plants totaled 4,038,943 bbl., an increase of 23.1 per cent over October 1946 and a 2.8 per cent increase over September 1947.

Gas used by utility power plants totaled 37,779,085,000 cu. ft. during October of this year, a decrease of 4.2 per cent from the previous month but a 23.1 per cent increase over October 1946.

Fuel-oil stocks on hand November 1 totaled 6,665,495 bbl., sufficient to last 51 days, as compared to the 49-day reserve a month previous and 59-day reserve a year ago, according to a report by the Federal Power Commission.

Three German Processes Described in Reports

Direct oxidation methods for the production of ethylene oxide and acetylene and a process of making ethylene oxide by chlorohydrination are described in three reports on the German hydrocarbon industry now obtainable from the Office of Technical Services, Department of Commerce.

According to the report, which is composed of material prepared by OTS investigators, a pilot plant rated at 100 tons a month based on direct oxidation of ethylene was designed and well on its way toward completion at Zweckel, Germany, in 1945. The oxidation units designed for this plant are fully described in the report.

The three reports include: "Manufacture of Ethylene Oxide Via Chlorohydrination of Ethylene," "Proposed Ethylene Oxide Manufacture Via Oxidation of Ethylene," and "Production of Acetylene by the Partial Combustion of Methane."

Fuels Forum Scheduled

An open forum on tractor fuels will be conducted by Committee D-2 on petroleum products and lubricants of the American Society for Testing Materials at the Edgewater Beach Hotel, Chicago, January 9.

New Aviation Gasoline Is Revealed by Boyd

PRODUCTION of a "super" aviation gasoline which increases the speed and range of planes was disclosed December 8 by W. R. Boyd, Jr., president of the American Petroleum Institute.

The gasoline, known as 115/145 grade, has distinct advantages over the long used 100-octane (100/130 grade) gasoline, Boyd said. The new product is now being supplied by the petroleum industry in substantial quantities. It has been tested and used by the military forces for some time, he said.

Speed and range of aircraft, Boyd said, are increased 12 to 15 per cent, and is as superior to 100-octane fuel as premium-grade motor gasoline is to regular.

The new fuel, Boyd said, is more difficult to make because it requires a larger proportion of synthetic hydrocarbons such as alkylate.

Oil companies able to supply the super fuel, he added, have agreed to furnish 1,940,000 bbl. during the second half of 1947 and are striving to increase deliveries by converting manufacturing operations.

Fighter planes built since the war call for the new super fuel, although they can operate less efficiently on 100/130 grade, and the entire output of the new fuel is going to the armed services.

October Lubricating-Oil Production Increases

Production of bright stock by 13 reporting companies which manufacture lubricating oils in the Midwest area totaled 296,900 bbl. during October, a substantial gain over the previous month of 255,422 bbl.

Output of viscous neutrals for October also increased over September, totaling 552,212 bbl., against 488,974 bbl. for the previous month. Paraffin-oils output in October was 116,711 bbl. as compared to 76,146 bbl. for September. Blended oils also increased over the previous month with an output of 581,497 bbl. as compared to 580,168 bbl.

Only steam refined stock showed a decrease for the month of October, dropping to 16,656 bbl. compared to 35,518 bbl. for September, according to the Western Petroleum Refiners Association.

Socony-Vacuum Drops Three Products Lines

Socony-Vacuum Oil Co., Inc., has announced that effective December 15 it will discontinue the manufacture of many products under the trade names, "Tavern," "Bug-a-Boo," and "Sanilac."

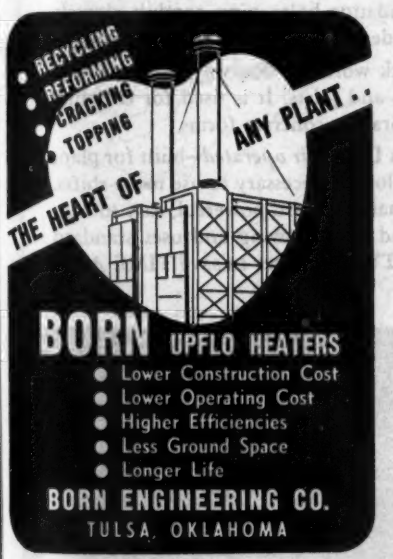
Included in the products, production rights to which have been sold, are household waxes, cleaners, insecticides and similar products.

Work on Salt Lake Plant To Start Next Spring

Construction of Standard Oil Co. of California's $5,000,000 refinery at Salt Lake City, Utah, has been scheduled to begin in the spring as soon as weather permits. Initial capacity has been designed for 25,000 bbl. of crude daily. Completion is scheduled within the next 12 months.

The refinery, which will serve the Boise Basin and Spokane-Walla Walla areas, will receive its crude supply from Rangely field in western Colorado.

The crude-distillation unit will be built by the Bechtel Corp.



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PIPE LINES

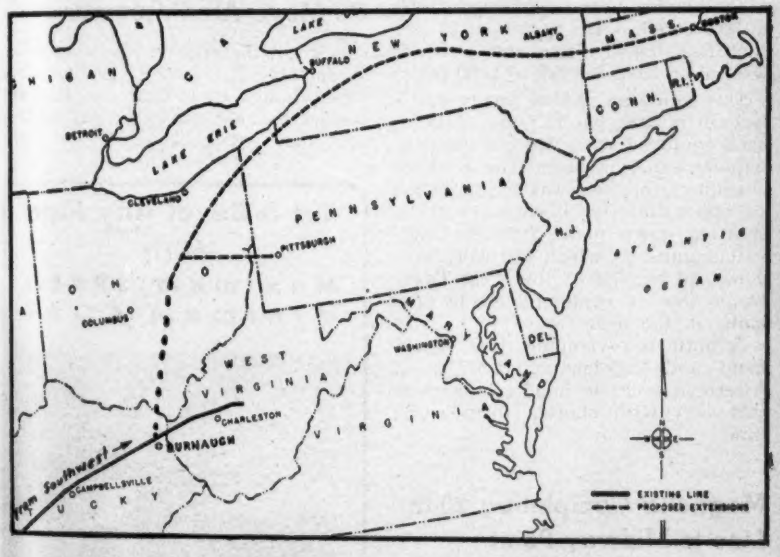
Engineering Work Begun On Kentucky-Boston Line

HOUSTON.—A Federal Power Commission hearing is expected probably in January on one of the largest expansion projects in the natural-gas industry—Tennessee Gas Transmission Co.'s proposal to lay a 30-in. third loop and to extend its system into New England.

Preliminary engineering work already has been started by the company in anticipation of the hearing. The 24-in. extension would begin at a point on the present line in Kentucky and extend northeast to a terminal near Boston. (See accompanying map). A 16-in. extension to Pittsburgh would be laid off the new line to Ohio. The project also contemplates five new compressor stations and additions to existing stations totaling 125,200 hp.

The company is now laying a 26-in. second parallel line to its original 24-in. line which extends 1,265 miles from South Texas to West Virginia. Completion of the second line will raise throughput from its present 310,000,000 cu. ft. daily to 600,000,000 cu. ft. daily.

The third line would increase system capacity to 1,055,000,000 cu. ft. daily. Total cost of the third loop and the Boston extension would be about $150,000,000.



Route of Tennessee Gas Transmission Co.'s proposed extension to Boston

O. R. Smith Opposes Effort To Curtail Contractors

O. R. Smith, president, Smith Contracting Co., with the assistance of other contractors is preparing to defend a suit brought in the form of a motion for a declaratory order from the Interstate Commerce Commission to restrict transportation operations of contractors engaged in pipe-line construction.

In this suit the complainants are Parkhill Truck Co. and others including J. L. Cox & Son, Dunn Brothers and J. R. Vandeveer & Son. The defendants, O. R. Smith et al, include J. R. Horrigan, R. H. Fulton and C. S. Foreman. The object of the suit is to require that transportation of supplies and equipment from the railhead to construction operations be handled only by trucking contractors licensed by ICC.

The complainants ask for the following: (a) That a declaratory order be entered determining the rights and status of contractor defendants to engage in transportation of pipe, pipeline material, machinery and equipment incidental to or used in connection with construction, repairing or dismantling of gas, gasoline, or oil pipe lines, between any points over public highways in interstate commerce without having obtained from

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the commission certificates of public convenience and necessity as contract carriers authorizing such operations. (b) That a "declaratory order" be entered determining the status of defendants as "motor carriers" as the term is defined by 49. U.S.C.A., Sec. 303 (a) (16). (c) And for such other and further relief to which they may show themselves entitled.

Another issue in which O. R. Smith is seeking the collaboration of other pipe-line contractors is a protest against certain decisions regarding federal income tax deductions in connection with accounts concerned with the operation of construction equipment.

Atlantic Boosts Capacity Of West Texas Outlet

Atlantic Pipe Line Co. has increased the capacity of its main line system for transporting West Texas crude oil from Midland to Atreco, near Port Arthur, Tex.

By installing new impellers for handling a larger volume, the throughput of the line has been raised from 40,000 to 48,000 bbl. daily, a gain of 20 per cent. In doing this, discharge pressure was raised from 800 psi. to 1,000 psi.

This trunk line, which was originally built in 1929, has 11 pump stations, each equipped with two electric centrifugal pumping units. The work of changing propellers was accomplished in approximately 4 weeks without shutting down more than the individual units on which the work was done. No looping of the West Texas trunk line is contemplated by Atlantic in the near future.

Atlantic is revamping dock equipment and ship-loading facilities at Atreco in order to handle tankers at this port with shorter turn-around time.

Magnolia Completing 20-In. Line to Midway Point

Magnolia Pipe Line Co. is completing the Corsicana-Conway section as a "solid line" this week. The company's Conway, Ark., station site is at a midway point on the 647-mile 20-in. line now being laid from Corsicana, Tex., to Patoka, Ill. Already the line is filled with crude oil for a distance of 200 miles; additional oil is pumped into the line as sections are completed northward.

This week river crossings are being completed at the Red and Arkansas rivers. Within a week river crossings will be finished at the Mississippi, Little Missouri and Ouchita rivers.

At all of the centrifugal pump stations on the project, construction work is about 80 per cent completed. The diesel engine station at the Patoka, Ill., terminal is 40 per cent completed. Early this week, more than 400 miles of 20-in. pipe had been laid.

Magnolia Pipe Line Co. is expected to let a contract this week for 10 miles of 8-in. in the Edna-Seeligson, Tex., area.

T.G.T. Completes 28-Mile Section of Loop Project

HOUSTON.—Tennessee Gas Transmission Co. last week completed a 28.3-mile section of its second looping program between Shaw and Ruleville, Miss.

The 26-in. line was laid by company forces and has been tied into the existing system. The company is connecting the loops as they are completed and as compressor capacity is made available, thus providing some increase in system capacity to meet heavy gas demands in its market territory this winter. A total of 329 miles or about one-third of the second looping program is now complete.

Great Lakes Line Unable To Move All Shipments

A great increase in the volume of shipments of refined products in Great Lakes Pipe Line Co. has exceeded the company's recent 60 per cent increase in capacity. The com-

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The H & M PIPE CUTTING and BEVELING MACHINE

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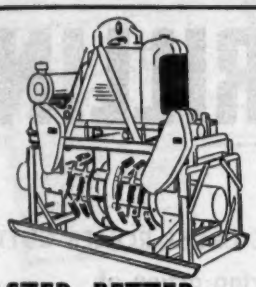

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Type RC Pigs are available in sizes 6" to 26", for crude and products pipe lines.

*Patent pending.

THE PIG WITH THE POKE CLEANS PIPE LINES

I. D. Williamson, Inc.
TULSA 9, OKLAHOMA

pany must turn down 15 to 20 per cent of shipments.

Gasoline deliveries are now the heaviest after a great accumulation of distillate shipments threw the line far behind. Great Lakes is a dominant server of the north and northwest.

Standard of California to Lay Rangely Line in 1948

Standard Oil Co. of California interests are planning construction of a crude-oil line from Rangely, Colo., to Salt Lake City, Utah, with operations scheduled to start in May or June 1948, according to reports.

The line will consist of 160 miles of 10-in. Three spreads will be used on the project. It is expected that the contract will be let in March.

Cities Service Gas Begins Gathering System Project

Construction was scheduled to get under way last week on the gathering system of Cities Service Gas Co. in Texas County, Oklahoma.

Plans included 7 miles of 20-in. line, 12 miles of 12-in., and 10 miles of line ranging from 10 to 4 in. in diameter.

Texas Pipe Line Awards Products Line Contract

Texas Pipe Line Co. has awarded a contract to Latex Construction Co., Houston, for construction of a 107-mile products line from Hearne to Austin to San Marcos, Tex.

Work on the project is scheduled to begin soon after January 1.

Included in the project will be a 79-mile Hearne-Austin 8⅝-in. line and a 28-mile Austin-San Marcos 6⅝-in. line.

Construction Started on 37-Mile Yoakum Line

Construction began last week on Houston Industrial Gas Co.'s 10-in. 37-mile natural-gas pipe line from Yoakum field to El Tora, Tex. The line is expected to be completed about February 1.

Refinery Deliveries Drop

Pipe line deliveries of crude oil to refineries during September averaged 3,876,000 bbl. daily. Intrastate pipe lines delivered a daily average of 2,603,000 bbl., a drop of 3,000 bbl. daily from August, while interstate lines delivered an average of 1,274,000 daily, a decline of 6,000 bbl. daily from the previous month, according to statistics compiled by the Bureau of Mines.

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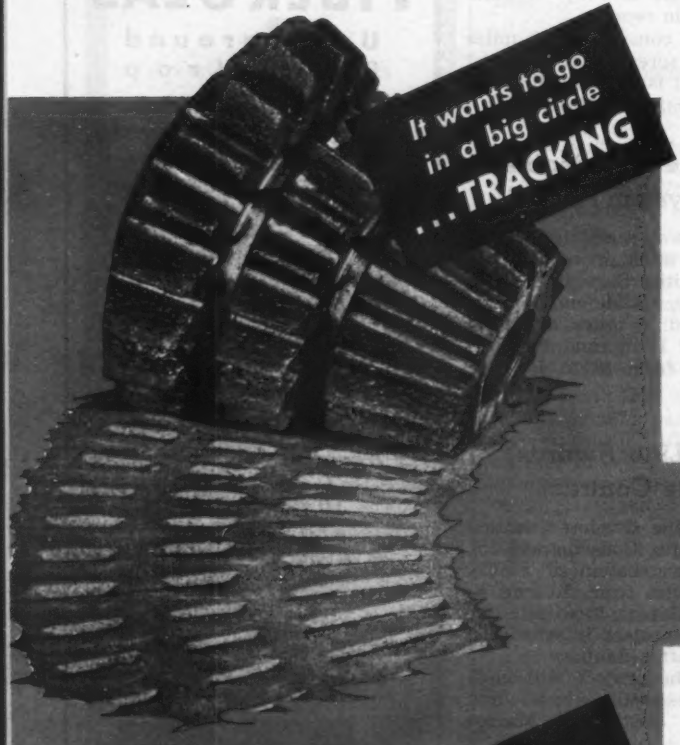
Why REED ROCK BITS give FASTER DRILLING

These photographs of a REED 2C CROSS ROLLER CUTTER in action show why the twisting-tearing action of each of the *four* cutters of a Reed Rock Bit gives faster drilling and more hole per bit.



This photograph shows what *would* happen *if* Reed cutters were designed to track. The direct pounding action would throw very little formation up into the mud stream. Furthermore, cutter teeth would tend to gum up and lose drilling efficiency.

This photograph shows how the Reed cutters actually twist and tear the formation as they ***penetrate.*** Notice that pieces of formation are actually thrown up into the mud stream to be carried to the surface. This plowing action also helps to keep the teeth clean.

Reed pioneered the Cross Roller principle of design

Exploration and Drilling

Hunton Strike in Oklahoma

IN northern McClain County, Oklahoma, 6 miles west of the town of Norman, and just south of the river, Mid-Continent Petroleum Corp. 1 Berry Estate, NW SW NW 32-9n-3w, found production in the Bois d'Arc section of the Hunton on a drill-stem test, which on basis of fillup, was estimated good for about 60 bbl. per hour of 40°-gravity oil. Existence of short-term leases in the vicinity is expected to start a more extensive testing program than ordinarily would be the case. The first of the new starts expected was Sinclair Prairie 1 White, which is starting in SW NE 20-9n-3w, or 2 miles north and ½ mile east of the strike.

The Mid-Continent test has passed up the Hunton production for the time being, and is now drilling on to test the Simpson section because of contractual obligations.

The successful well is located on a 409-acre tract, all south and west of the river which splits the section. The drill-stem test which started the excitement was made at 8,801-8,846 ft., after calling the top of the Bois d'Arc Hunton at 8,799 ft. Open 75 minutes, gas showed in 8 minutes, and in the remaining period it filled up with 4,500 ft. of 40°-gravity oil, no water, and no mud. Flowing pressure was 750 psi., and bottom-hole pressure 3,600 psi. The estimated rate of fillup was 64 bbl. per hour.

The following datum tops were reported: Oread —3,960 ft.; Belle City lime —5,040 ft.; Hogshooter —5,555 ft.; Checkerboard —5,810 ft.; Cleveland sand —5,869 ft.; First Oolitic lime —5,960 ft.; Oswego —6,728 ft; Bartlesville sand —7,044 ft; Burgess or unconformity sand —7,184 ft.; Base unconformity —7,198 ft.; Mayes —7,420 ft.; Woodford —7,532 ft.; Bois d'Arc Hunton —7,649 ft.; Haragan Hunton —7,703 ft.; Haragan lime —7,727 ft.; Chimney Hill Hunton —7,951 ft.; Sylvan —8,061 ft. corrected.

Comparative tops with Gulf Oil Corp. 1 Price in NE SE 17-9n-3w, and with Carter Oil Co. 1 Johnson in SW NE 13-8n-4w, show the Mid-Continent well running 262 ft. low with the Gulf well and 234 ft. high with the Carter well on the Oread; 188 ft. low and 238 ft. high respectively on the Bell City lime; 198 ft. low and 268 ft. high on the Hogshooter; 133 ft. low and 241 ft. high on the First Oolitic lime; 206 ft. low, and 332 ft. high on the Oswego; 208 ft. low to Gulf on the Mayes; 200 ft. low, and 562 ft. high on Gulf and Carter wells respectively at top of Woodford; and 189 ft. low, and 575 ft. high on top of Hunton Bois d'Arc.

The new well is reported to be located on a comparatively small seismic structure. It is an area which has been somewhat disappointing to several companies, because it is believed to be of spotty and generally poor porosity and permeability in prospective reservoir formations. In the opinion of some geologists this has been due to the fact that the structures tested had not had the prospective reservoirs exposed and subject to leaching action at any time in their geologic history. Conditions appear to have been favorable for the formation of oil in the area south of the Oklahoma City structure, but unless the potential reservoir beds were subjected to leaching action, the oil accumulation is apt to be small.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

ROCKY MOUNTAIN.—Neiber Dome discovery last January, put on production, makes 930 bbl. of 41°-gravity oil per day through ⅜-in. choke with flowing pressure of 1,410 psi. General Petroleum is completing its second producer in the third Frontier sand at Sand Creek. In Montana, Sinclair-Wyoming Oil Co. opens a new light oil pool in Frontier near its recent Madison discovery in Northwest Elk Basin. Seaboard Oil Co. test, west of Elk Basin, recovered 800 ft. of light oil in 1 hour from top of Tensleep.

CANADA.—Leduc field is extended ¾ mile south of former limits by East Leduc-South Brazeau 1, which flowed 2,280 bbl. of oil per day through various sized chokes, to become one of the best wells completed in the area.

CALIFORNIA.—Efforts of Seaboard Oil Co. and Bandini Petroleum Co. to develop the Bacon Hills field are hampered by structural conditions. The Texas Co. is preparing to put the finishing touches on their promising follow-up well to the recent oil discovery in the San Ardo area of Monterey County.

WEST TEXAS.—Gulf Oil Corp.'s confirmation well at University-Waddell field, Crane County, extends flowing production ½ mile north of discovery. Delaware sand gas show is reported in Argo Oil Corp. 1 Ikins, Reeves County test.

SOUTHWEST TEXAS.—Continental Oil Co. opens a new oil pool in northwestern Hidalgo County. The same company's wildcat in southern San Patricio County flowed 112 bbl. of oil in 20 hours on the last drill-stem test.

MISSISSIPPI.—James E. Kemp 2 Marks extends La Grange field to the north, and is preparing to set casing after running electric log. Humble Oil finds a new shallow salt dome in Covington County.

TEXAS GULF COAST.—According to latest reports, a new pool has been opened in Calhoun County by Fullerton Oil et al 1 Roemer, rank wildcat which flowed ungaged oil production from the Marginulina zone.

MID-CONTINENT.—In Kansas, Drillers Gas Co. brought in a Lansing-Kansas City producer just north of the Wichita city limits. Superior Oil Co.'s wildcat, 3½ miles southwest of East Lindsay field, Garvin County, Oklahoma, has a good show in the Pennsylvanian at 8,130-63 ft.

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MISSISSIPPI

La Grange Extension To Set Casing

JACKSON.—In the La Grange field, Adams County, James E. Kemp 2 H. M. Marks, is preparing to set casing after running Schlumberger to total depth of 6,294 ft. This well, a north extension to the field, is approximately 9 ft. higher than the W. J. O'Brien 1 R. L. Parker. Schlumberger tops were: Wilcox 4,357 ft., sand 4,630 ft., Basal Baker shale 6,152 ft., Baker sand 6,226 ft., Wilson oil sand 6,243 ft.

At Ovett, Jones County, Gulf Refining Co. 1 L. L. Majors, 29-6n-11w, is continuing to test. Following a progressive decline on each day's test, the well finally ceased to flow on November 26. Since that time perforations have been flushed with oil and also treated with mud acid, but no sustained flow has been achieved.

Gulf's 1 B. L. Sholar, in Section 30-6n-11w, Jones County, had no shows in cores through the basal Eutaw "Christmas" sand zone, although the well is approximately 10 ft. higher structurally than the 1 Majors. Schlumberger was run at 1,001 ft., which reveals a fault of approximately 120-ft. displacement at top of the Midway. Minor faults are also indicated to occur in 1 Majors in Basal Wilcox and in the Selma chalk.

In Covington County, Humble Oil & Refining Co. 1 Leroy Rogers, 5-7n-14w, has encountered anhydrite at 2,114 ft. to prove a new shallow salt dome for the state. At present the well is still in anhydrite at 2,228 ft.

Four new locations this week are in proven areas, one in Baxterville field, Lamar County, and three in Brookhaven field, Lincoln County. Development wells completed were six oil and five gas, with two wildcats dry, one each in Lauderdale and Union counties.

MISSISSIPPI WILDCAT FAILURES

Lauderdale County: American Liberty Oil Co. 1 Flintkote Corp., 12-5n-14e, dry, TD 5,010 ft., Eutaw 3,008 ft., Tuscaloosa 3,397 ft., Marine Tuscaloosa 4,208 ft., Massive sand 4,437 ft.

Union County: Harry L. Cullet (formerly P. J. McAlpine et al) 1 Nabors, old well drilled deeper, SW SW NE 36-7n-3e, dry, TD 1,617 ft., Selma 50 ft., Eutaw 920 ft., Tuscaloosa 1,200 ft., Paleozoics 1,565 ft.

TEXAS GULF COAST

Calhoun County Wildcat Tests Ungaged Oil Flow

HOUSTON.—Fullerton Oil Co. and Ryan Consolidated Petroleum Co. 1 Margaret F. Roemer, wildcat test in Calhoun County, approximately 10 miles south-southwest of Port Lavaca, and 4½ miles southeast of Long Mott, is reported to have been completed for a good oil producer through a 5/16-in. choke, with no gage as yet. Oil sand was logged at 7,674-88 ft. in Marginulina zone. With total depth of 7,800 ft., operators set 5½-in. casing to 7,736 ft. for the test. On drill-stem test at 7,680-88 ft., prior to setting of casing, the well developed 96 psi. working pressure in 20 minutes, on closed tool, built up shut-in pressure to 120 psi., and recovered 2,460 ft. of pipe-line oil 44° gravity, bottom-hole pressure 1,750 psi. flowing.

P. R. Rutherford et al 1 J. F. Welder, wildcat in Refugio County, 7 miles west of Vidauri and 5 miles north-northwest of Greta field, flowed gas on a ¼-in. choke, with 1,580 psi. working pressure through perforations at 4,869-74 ft. It is now waiting on potential test. Total depth is 6,235 ft., with 5½-in. casing set to 4,900 ft. for the completion. This well is located in Mrs. Anna Jackson Survey.

Production at West Bernard field in Wharton County has been extended by Tide Water Associated Oil Co. 1 G. E. Cook, in J. M. Rose Heirs Survey. Drilled to a total depth of 7,858 ft., this well is reported to have flowed 3,100,000 cu. ft. of gas with 6 bbl. of condensate per million cu. ft. Pressure 2,500 psi. on tubing. The 7-in. casing was set to 7,798 ft.

There were 37 new locations reported this week with 13 being wildcat starts, 2 each in Bee, Brazoria, Calhoun and Wharton, and 1 each in Chambers, Karnes, Live Oak, Matagorda and Victoria counties Three successful exploratory tests were completed to open a new gas-condensate pool in Fort Bend County, a gas pool in Harris County, and a new oil pay for Coletto Creek field in Victoria County.

TEXAS GULF COAST SUCCESSFUL WILDCATS

Fort Bend County: New gas-condensate pool—Jack W. Frazier and Grubb & Hawkins 1 J. R. Farmer, I&GN Sur., Sec. A-353, 1½ mi. SW of Clodine field production, TD 7,665 ft., top sand 7,415 ft., perforations 7,415-20 ft., IP: est. 100 bbl. condensate per day and 2,942,000 cu. ft. gas per day through a ¼-in. choke, gas-condensate ratio 30,381, TP 2,115 psi. Shut-in pressure 3,005 psi., gravity 58°, no water.

Harris County: New gas pool—Union Producing Co. 1 Homer J. Moore, John E. Durkee Sur., 2½ mi. SE of North Houston, TD 8,500 ft., top sand 7,705 ft., perforated 7,705-10 ft. IP: ungaged gas well.

Victoria County: New oil pay Coletto Creek—Jergins Oil Co. 1 Katie Willemin, Pedro Gallardo Gr., top pay 4,330 ft., TD 5,003 ft., perf. 4,320-21 ft. IP: 107 bbl. per day through a ⅛-in. choke, gas-oil ratio 1,869, TP 560 psi., casing sealed, gravity 24°, no water.

TEXAS GULF COAST WILDCAT FAILURES

Chambers County: Continental Oil Co. 2

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Mrs. Pearl R. Jackson, Maria Teresa Borden Sur., 4 mi. SW of Willow Slough production in Jackson Ranch area, dry, TD 10,002 ft.

Fort Bend County: Dan J. Harrison, Jr. 1 Alexander et al, Hy Scott Sur., 2 mi. NW of Rosenberg townsite, dry, TD 6,484 ft.

R. F. King & L. J. Krenek 1 Edw. Krenek, G. Borden Sur., Sec. 7, 1 mi. NW of Orchard townsite, dry, TD 1,079 ft.

Karnes County: Southern Minerals Corp. 2 Bryan Campbell, J. R. Baker Sur., 4 mi. N-NW of Weigang field of Atascosa County, dry, TD 3,243 ft.

Lavaca County: Wesley W. West 1 Edward A. Sibley, Wm. Blundell Sur., 2 mi. E-SE of Hope gas field, dry, TD 9,525 ft.

Liberty County: The Texas Co. 1 John A. Deering, 1, H&TC Sur., Sec. 134, Dayton area, dry, TD 7,002 ft.

Tyler County: Amerada Petroleum Corp. 1 Ella M. Goolsbee, Joshua Fairdoth Sur., 5½ mi. E of Warren townsite, dry, TD 7,820 ft.

APPALACHIAN FIELD

Jackson County Wildcat Will Test New Area

PITTSBURGH.—In Grant district, Jackson County, West Virgina, United Carbon Co. et al have started drilling an Oriskany wildcat on the Nathaniel Waterbury farm, starting at an elevation of 930 ft. It is the first venture in the vicinity.

In Steele district, Wood County, United Fuel Gas Co. is drilling an Oriskany test on the M. A. Webber farm, which topped the Corniferous lime at 4,515 ft. from a surface elevation of 818 ft. or datum minus 3,697 ft. It appears considerably higher on structure than three previous tests in the district: Belmont Quadrangle Co.-C. D. White which topped the limestone formation at datum minus 3,937 ft.; Glen W. Roberts-I. B. Robinson datum minus 4,014 ft.; United Carbon Co.-J. K. Grimm datum minus 3,875 ft. The sand condition will be important from all angles.

In Greenbrier district, Summers County, SE part of the state, Godfrey L. Cabot, Inc. is drilling at 6,890 ft. in the wildcat on W. M. Elswick farm which appears now 139 ft. below the base of the Oriskany sand which was logged at 6,731-51 ft. and from which there is no production.

In Shady Springs district, Raleigh County, Godfrey L. Cabot, Inc. has reached 6,756 ft. in the rank wildcat on Russell & Doloff tract which, from a surface elevation of 1,999 ft., places it datum minus 4,757 ft.

In Elk district, Kanawha County, United Fuel Gas Co., deepening No. 6,239 Payne Gallatin Mining Co. to the Oriskany sand, struck an oil show of ¾ bbl. per day in shale at 4,312-18 ft. which, while an interesting showing, will probably not prove important.

New locations in West Virginia totaled 7 and were in Crook district Boone County; Elk district, Kanawha County; Grant and Union districts, Pleasants County; Clay district, Ritchie County; Union district, Wood County; Oceana district, Wyoming County.

In Springhill Township, Fayette County, southwest Pennsylvania, Peoples Natural Gas Co. is drilling 80 ft. in the Onondaga chert at 7,737 ft. in the wildcat on Allie May Martin without any gas showing. New Penn Development Co. et al is drilling below the Tully lime in the wildcat on Paul E. Dunham, and find the section to the top of the Onondaga now thickening with possibilities that it may be lower than the original test in this section. In Georges Township, this company bottomed No. 2 Mary I. Smith at 7,517 ft. through the Oriskany sand, which was void of production, and will plug back and shoot the Onondaga chert which now maintains a gage of 264,000 cu. ft. of gas.

New locations in southwest Pennsylvania totaled 7 and were in Kiskiminitas Township, Armstrong County; Monroe Township, Clarion County; Washington Township, Indiana County; Beaver Township, Jefferson County; Allegheny and Bell townships, Westmoreland County.

SOUTHWEST PENNSYLVANIA WILDCAT FAILURE

Allegheny County, Patton Township: John Walley et al 1 Walter Glendenning, dry, TD 3,375 ft.

WEST VIRGINIA SUCCESSFUL WILDCATS

Kanawha County, Elk district: United Fuel Gas Co. 6,237 H. K. & Luvernia Harper, 5,625,000 cu. ft. gas, elev. 924 ft., TD 5,260 ft. in Oriskany sand.

Lewis County, Freemans Creek district: Carnegie Natural Gas Co. 1,638 T. L. Moneypenny, 989,000 cu. ft. gas, top Gordon sand 2,291 ft., gas 2,293-96 ft., TD 2,300 ft.

Mingo County, Harvey district: E. C. Ware 1 James Johnson, 500,000 cu. ft. gas from brown shale, TD 3,662 ft.

WEST VIRGINIA WILDCAT FAILURES

Fayette County, Nuttall district: Columbian Carbon Co. 996 Franklin Real Estate Co., dry,. Corniferous lime 7,115 ft., show of gas 7,151 ft., Oriskany 7,215 ft., TD 7,403 ft.

Quinnimont district: Columbian Carbon Co. 967 Laurel Creek Land Co., dry, Big lime 2,142 ft., no Berea, TD 3,637 ft.

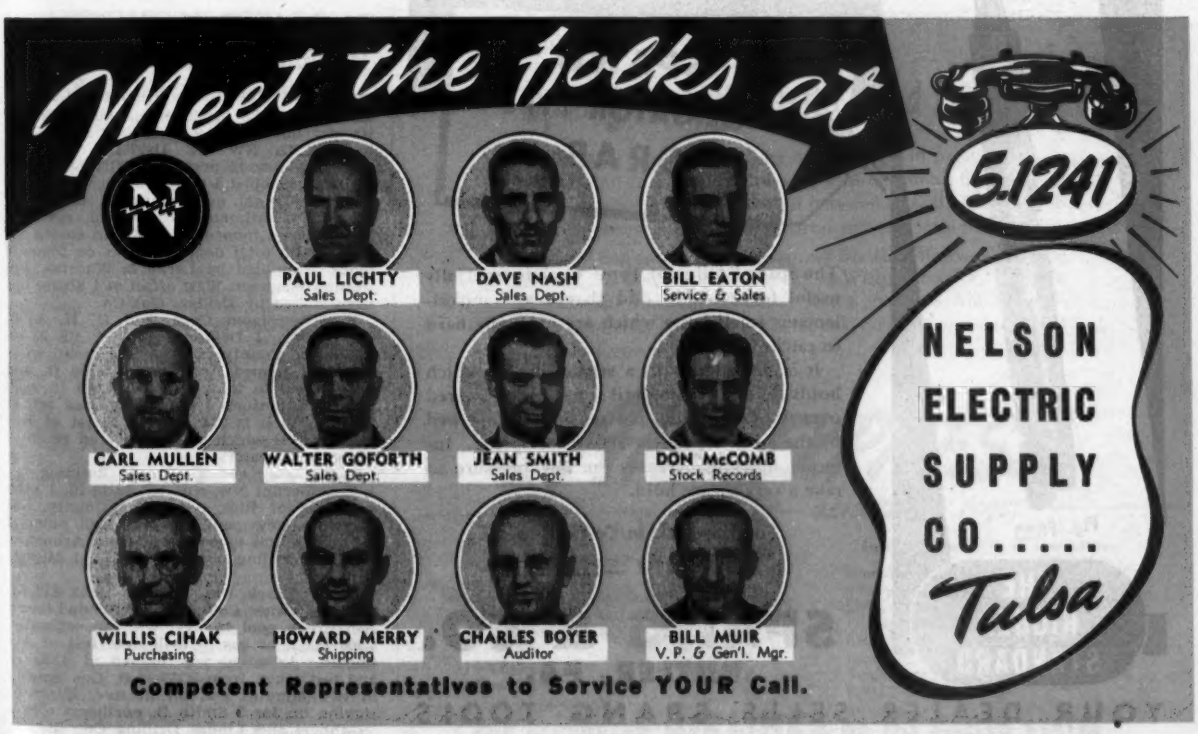
Kanawha County, Poca district: Hal C. Nease 1 McKinley Harding, dry, TD 1,796 ft. in Big lime.

SOUTH LOUISIANA

New Pay Discovery Flows 144 Bbl. Daily

NEW ORLEANS.—A new sand for the Dave Haas discovery area southwest of Eola field production in Avoyelles Parish, has been opened by Atlantic Refining Co. 2 Haas Investment Co., 9-2s-2e, located ¼ mile northwest of the 1 Haas discovery. On potential test the well flowed 144 bbl. of oil per day through a ⅛-in. choke, with 1,500 psi. flowing pressure on the tubing and no water in the flow. Total depth is 8,638 ft., with 7-in. casing to 8,611 ft. Production is through perforations at 8,470-90 ft. The discovery was completed through perforations at 8,562-72 ft. Atlantic has staked its third test, 1 W. L. Stokes, as an east offset to the discovery well.

Superior Oil Co. of California 1-A Gulf of Mexico, on State Lease 884, Block 71, 19 miles off Vermilion Parish shore and



22 miles south of Fresh Water Bayou field, cored from 12,952-972 ft., with no shows. Operators are drilling ahead below 12,981 ft. Prior to protection pipe setting, the well attempted to blow out while coming out of the hole at 12,926 ft.

There were 23 new locations reported this week all in proven areas. Two successful exploratory wells were completed this week, one opening a new oil sand in Dave Haas pool of Avoyelles Parish, and a new oil pool opener for the Ship Shoal area in Gulf of Mexico offshore Terrebonne Parish. Two wildcats were dry, one each in Calcasieu and St. Charles parishes.

SOUTH LOUISIANA SUCCESSFUL WILDCATS

Avoyelles Parish: New oil sand, Dave Haas pool—The Atlantic Refg. Co. 2 Haas Investment Co., 9-2s-2e, ¼ mile NW of Haas discovery well, SW of Eola field, top sand 8,470 ft., perforations 8,470-90 ft., TD 8,638 ft., IP: 144 bbl. oil per day through a ¼-in. choke, gas-oil ratio 1,180, TP 1,500 psi., gravity 42°, no water.

Terrebonne Parish: Oil discovery "Block 32" (Ship Shoal area)—Kerr-McGee Oil Ind., Inc. 1 State, Block 32, Lease 754, 12 miles S of Point Au Fer production, that distance out in the Gulf of Mexico, top salt 2,537 ft., TD 2,463 ft., top sand 1,734 ft., perf. 1,734-50 ft. IP: 600 bbl. oil per day through a 32/64-in. choke, gas-oil ratio low, TP 25 psi., CP 200 psi., gravity 25°.

SOUTH LOUISIANA WILDCAT FAILURES

Calcasieu Parish: Continental Oil Co. 1 Ellen P. Gwyn, 5-11s-8w, 1¾ mi. N of production at South Lake field, dry, TD 11,462 ft.

St. Charles Parish: Wm. Helis 3 Milliken-Farwell, 26-12s-20e, in Hahnville area, dry, TD 9,023 ft.

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MICHIGAN

Michigan Operations Limited by Cold Weather

SAGINAW.—Operations slowed by wintry weather, completions in Michigan oil and gas fields were limited to 12 in the past week while 12 new locations in 9 counties were recorded.

Two of the completions in the Kimball Lake field of Newaygo County accounted for all but 35 bbl. of the 2,650 bbl. initial potential from the four producer completions. The two small wells were drilled in Kawkawlin Township of Bay County. Aside from four dry holes, there were four good gas wells completed, three in Clare County, the other in Osceola County. Their productivity rating was from 7,500,000 to 15,500,000 cu. ft. of gas per day. Wildcat failures in Arenac, Mecosta and Midland counties and a dry development hole in Montcalm County completed the list of completions.

The new drilling locations were as follows: three in Newaygo County, two in Oceana County, one each in Grand Traverse, Tuscola, Bay, Arenac, Allegan, Montcalm and Roscommon counties.

MICHIGAN WILDCAT FAILURES

Arenac County, Adams Township: Basin Oil Co. and Don F. Rayburn 1 State-Adams, NW NE SE 1-19n-3e, dry in Dundee, TD 2,977 ft.

Mecosta County, Colfax Township: Michigan Consolidated Gas Co. 1 London-Sapp et al, SW NE NE 36-15n-9w, dry, TD 1,394 ft.

Midland County, Warren Township: Sun Oil Co. 1 Valdo Grover et al, NW SW SE 20-16n-2w, dry in Dundee, TD 3,928 ft.

KANSAS

Producer Hit North of Wichita City Limits

DRILLERS GAS CO. has hit a Lansing-Kansas City producer just outside Wichita city limits to the north and its 1 Rombach, CNL NW NE 11-27-1w, Sedgwick County. After 12 perforations from 2,715-20 ft., well swabbed 5 bbl. of oil per hour natural. A 1,000-gal. acid treatment raised production to estimated 100-150 bbl. per day. Lansing was topped at 2,594 and casing set at 2,740 ft., total depth. Well is on 560-acre block assembled by Lerke & Whortan and Vernon Wagoner. West offset at 1 Slease has been staked by Drillers Gas Co.

Bay Petroleum Corp. and H. H. & B. Drilling Co. 1 DeWerff, SW SW SE 25-20-12, Barton County, is likely successful wildcat. Test topped Arbuckle at 3,380 ft. and was drilled to total depth of 3,395 ft. with shows in bottom 6 ft. Casing was set at 3,383 ft. Well is 2 miles northwest of Kowalsky pool which was discovered recently by same operators.

E. H. Adair and El Dorado Refining Co. 1 Chamberlin, NW NW NE 18-19-10, 1 mile southeast of Rick pool, Rice County, has opened a new pool. On test, well pumped 216 bbl. of oil in 24 hours from Arbuckle. Adair is drilling northeast offset, 1 Musenberg.

Ben F. Brack, Inc., 2 Smith B, SE SW SE 1-21-16, Pawnee County, has extended South Ash Creek pool to west with an estimated 4,300 M.c.f. of gas in drill-stem test of Arbuckle. Arbuckle was topped at 3,750 ft. and test taken from 3,757-78 ft. Gas showed in two minutes and oil in five. Brack is rigging up for 3 Smith B, northeast offset.

Gabbert and Lindas Drilling Co., Inc., is

starting rank wildcat on western side of Pawnee County at 1 Farrell, NE NE NE 18-22-20, 1 mile east of Hodgeman County line and 24 miles west of Larned. Nearest production is 30 miles.

Another wildcat location far from production is Bridgeport Oil Co., Lion Oil Co., and Phillips Petroleum Co. 1 Sutton, SW SW SW 16-27-8, 12 miles east of Cunningham pool and 7½ miles northwest of Kingman, Kingman County.

Slow week for locations and completions was recorded with 41 locations and 47 completions. Ellis, Butler, Rice, and Barton counties dominated the picture accounting for 21 of the locations and 26 of the completions. Ellis completed 13 wells including 6 oilers, 6 dry holes, and 1 abandoned location.

KANSAS WILDCAT FAILURES

Butler County: J. P. Gaty 1 Woodie, SW SE SW 2-29s-3e, dry, TD 2,985 ft., Lansing 1,890 ft., Kansas City 2,240 ft., Mississippian 2,750 ft., Basal Mississippian 2,898 ft., Simpson 2,977 ft., Arbuckle 2,982 ft.

Graham County: Harry Gore and Bennett & Roberts Drilling Co. 1 Cook, SE S SE 17-7s-21w, dry, TD 3,731 ft., Lansing-Kansas City 3,385 ft., conglomerate 3,658 ft., Arbuckle 3,701 ft with oil stain.

Norton County: Wilcox Oil Co. and Bennett & Roberts Drilling Co. 1 Wagoner, NW NW NW 35-4s-24w, dry, TD 3,855 ft., Topeka 3,296 ft., Lansing-Kansas City 3,528 ft., Basal Kansas City 3,721 ft., conglomerate 3,831 ft., Arbuckle 3,855 ft., no shows.

Rice County: Jones & Shelburne & Farmer 1 West, NE NE SW 22-19s-6w, dry, TD 3,525 ft., brown lime 2,738 ft., Lansing-Kansas City 2,796 ft., Mississippian 3,184 ft., Kinderhook 3,208 ft., Viola 3,400 ft., Simpson 3,440 ft., Arbuckle 3,474 ft.

Rooks County: Mallard Drilling Co. 1 Ellis, NE NE NE 2-8s-19w, dry, TD 3,390 ft., anhydrite 1,040 ft., Heebner 3,000 ft., brown lime 3,018 ft., Lansing-Kansas City 3,037 ft., Basal Kansas City 3,302 ft., conglomerate 3,324 ft., Arbuckle 3,350 ft.

Aylward Production 1 Shepard, SW SW NE 23-10s-18w, dry, TD 3,891 ft., Lansing-Kansas City 3,365 ft., conglomerate 3,686 ft.

SOUTHWEST TEXAS

New Oil Pool Opened In Hidalgo County

CORPUS CHRISTI.—Continental Oil Co. 1 Lloyd M. Bentsen, wildcat in western Hidalgo County, is being completed as a new field opener, 8 miles east of the Rincon field of Starr County, and 23 miles northwest of Edinburg, in Los Guages Grant. Drilled to a total depth of 9,919 ft., this well is now completing after testing more than 10 bbl. hourly on initial drill-stem test in sand at 5,410-21 ft.

Burnell-Wilcox field, in Karnes County, received a new oil producer on the east flank by the completion of Luling Oil & Gas Co. 26-B W. W. Boyce, which flowed 42 bbl. of 41.2°-gravity oil per day through a ⅛-in. choke, with gas-oil ratio of 5,715, through perforations at 6,851-52 ft. in the Luling sand. Total depth is 7,060 ft., top of Luling sand 6,824 ft. Tubing pressure 1,225 psi., casing 2,460 psi.

Continental Oil Co. 1-S J. F. Welder, wildcat between the Angelita and O'Neill fields in southern San Patricio County, 4 miles northwest of Calallen, tested 48 bbl. of oil in 7 hours, gas-oil ratio 7,680, on a drill-stem test through perforations at 7,500-08 ft., and continued another 13 hours flowing total of 112 bbl. of 39°-gravity oil in 20 hours, with gas-oil ratio increased to 10,000. Operators are preparing to make another test at 6,040-50 ft.

Magnolia Petroleum Co. 1 Smith, wildcat 6 miles northeast of Pearsall in Frio County, bailed down, found bottom of hole

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to be 3,724 ft., bailed 5 bbl. of oil and 9½ bbl. water in 12 hours, deepened 4 ft. to 3,728 ft. and is now testing again, in the Navarro sand. This well is in the southwest corner of O. C. Smith Survey, 8 miles northeast of Pearsall field.

There were 30 new locations reported this week, 11 of which are wildcats, 4 in San Patricio, 2 in Webb, and 1 each in Caldwell, Duval, Edwards, McMullen and Williamson counties. One new oil pay for Robstown field was opened this week while 15 wildcats were dry, 3 in Duval, 2 each in Jim Hogg, San Patricio and Webb, and 1 each in Bexar, Caldwell, Edwards, Frio, McMullen and Willacy counties.

SOUTHWEST TEXAS SUCCESSFUL WILDCAT

Nueces County: New oil pay Robertson pool—Comanche Corp. 1 A. Studer, Sec. 7, Lot 3, Geo. H. Paul's Subd. of Driscoll Ranch, in M. L. de Herrera Gr., 1 mile NW of Robstown, top pay 5,045 ft., TD 8,001 ft., perf. 5,046-54 ft., IP: 75 bbl. oil per day through a ⅛-in. choke, gas-oil ratio 296, TP 600 psi., CP 1,225 psi., gravity 41°, no water.

SOUTHWEST TEXAS WILDCAT FAILURES

Bexar County: George M. Cowell et al 1 Albert W. Bitter, John M. Becerra Sur., 12 mi. SW of San Antonio, 1 mi. W of Gas Ridge field, dry, TD 1,712 ft.

Duval County: Edwin B. Cox & Jake L. Hamon & Geo. H. Coates 1 Annie Barnes, BS&F Sur. 790, 16 mi. SW of Freer, 2 mi. SW of Peters field, dry, TD 3,608 ft.

J. W. Gorman 5 F. D. Lowe, AB&M Sur. 76, 16 mi. NE of Freer, dry, TD 2,413 ft.

H. H. Howell 1-D Humble O&R Co.-Tinney, BS&F Sur. 531, Piedras Pintas area, dry, TD 5,018 ft.

Caldwell County: Dick Bedell & D. A. Jones 1 F. Schulle, Thos. Maxwell Sur., 11½ mi. SW of Lockhart, dry, TD 2,143 ft.

Edwards County: Creslenn Oil Co. 1 Fred Earwood, CCSD&RGNG Sur. 165, 20 mi. NW of Rock Springs, dry, TD 466 ft.

Frio County: Newman Bros. & Skinner & Eddy Corp. & Herbert J. Schmitz 1 Elizabeth Hausser, L. S. Haigis Sur. 333, 14 mi. W-SW of Pearsall, dry, TD 4,563 ft.

Jim Hogg County: E. E. Sorey 1 Wilver Lake Ranches, Inc. et al, Diego Ynojosa Gr., 2 mi. E of Hebbronville, dry, TD 4,650 ft.

Sun Oil Co. 14-A T. T. East, Sur. 66, Santo Domingo de Arriba Gr., 29 mi. SW of Hebbronville, dry, TD 4,990 ft.

McMullen County: Stice & Heard 1 Shiner Ranch, Sec. 49, C. C. Shumway Subd. of Shiner Ranch, 25 mi. W of Geo. West, G. J. Goode Sur. 55, dry, TD 2,513 ft.

San Patricio County: F. M. Boykin, Jr. et al 1 S. F. Jackson, Sec. 43, 4th Addn. Taft Farm Lands, 6 mi. NE of Taft, dry, TD 5,885 ft.

Geo. Farenthold & Rand Morgan 1 R. Morgan fee, Jos. McIntyre Sur., 6½ mi. W of Sinton, dry, TD 6,549 ft.

Webb County: Dulaney Oil Co. 2 J. G. Garcia, Los Ojuelos Gr., 5 mi. S of Oilton, dry, TD 2,482 ft.

Humble 1-B Louis Yeager, H. C. Yeager Sur. 346, in extreme NE cor. of Webb County and just N of Adami field, dry, TD 8,026 ft.

Willacy County: Magnolia Pet. Co. 4 F. Armendais, San Juan de Carricitos Gr., 9 mi. NE of San Dominio, in SE cor. of Willacy County, dry, TD 10,183 ft.

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N. CENTRAL TEXAS

Montague County Wildcat Tests Promising Strawn Sand

WICHITA FALLS.—In Montague County, 3 miles north of Stoneburg, A. R. Dillard 1-B Walker was assured of production in the Strawn sand when a drill-stem test between 4,962-72 ft. flowed oil for 30 minutes. The amount of flow was unestimated but total recovery when pipe was broken down was 820 ft. of oil and 30 ft. of oil-cut drilling mud. Bottom-hole pressure was 2,025 psi. Operators continued drilling to contract depth of 6,500 ft.

In southwestern Clay County, S. D. Johnson and Acme Die & Machine Co.'s third test in the new Acme Strawn sand field promised to open production in a deeper sand, tentatively identified as the Vogtsberger. The new test, 3 Carl Mobley, had the sand from 4,588-98 ft., and after running electric survey, took a drill-stem test of the interval. Gas came to the surface in 1 hour and 25 minutes, and total recovery was 60 ft. of 45°-gravity oil, plus 90 ft. of oil-cut mud. Bottom-hole pressure was 1,625 psi. Operators set casing to 4,588 ft. for production tests. The same interests' 1 and 2 Mobley both produce from the Strawn sand around 4,000 ft.

In Throckmorton County, 8 miles southeast of Throckmorton, James H. Snowden et al 1 List was reported swabbing at the rate of 4 to 5 bbl. of oil an hour, with estimates of its pumping potential running as high as 100 bbl. of oil a day. The well had Mississippi limestone at 4,648 ft., casing was set to 4,652 ft. and the section treated with acid. In west central Throckmorton County, Texon Oil & Land Co. 1 Davis, Block 85, BBB&C Survey, perforated from 5,134-43 ft. in the Bend Conglomerate and recovered some oil in swabbing down to 2,000 ft. from the surface.

New drilling outside of established areas included Continental Oil Co.'s 5,000-ft. rotary test on the J. Copeland lease, Section 2,718, TE&L Survey, 5 miles west of Perrin in southeast Jack County. Two other tests for Jack County are Warren Oil Corp. 1-A S. W. Leatherwood, a 6,000-ft. test in the E. S. Marley Survey, about 7

miles west of Jacksboro, and 4 miles north of Jermyn, where Warren staked location for its 2-C J. D. Gillispie in the J. W. Colston Survey, A-1,366, to test to 6,000 ft.

In Clay County, development work centered around the Joy Strawn field, from 1 mile west of the Joy Townsite to E. B. Clark 1 Childs, a semiwildcat in Block 24, J. H. Belcher subdivision, about 5 miles west of the town. On last report the 1 Childs had recovered some 200 ft. of oil-cut mud on a 1-hour drill-stem test in the Strawn at 4,934-59 ft. In northern Clay, Phillips Petroleum Co. made location for a 6,250-ft. test 5 miles east of Henrietta. It is the 1 Bryant Edwards, in Section 7, T&NO RR Survey, Abstract 669. Six miles west of Jolly, Star Oil Co. was reported moving in to its 1 Annie Morris, a 4,800-ft. rotary test in the southeast section of the W. Davis Survey.

New developments for the week included 53 locations in North Texas, and 13 in West Central Texas. Archer County led with 17, followed by Clay 6, Cooke 8, King 1, Montague 2, Wichita 11, Wise 1, and Young 7. In West Central Texas they were: Throckmorton 6, Stephens 2, Coleman 2, and 1 each in Fisher, Jones and Shackelford counties.

Development oil wells, by counties, were: Archer 2, Baylor 1, Clay 3, Cooke 1, Montague 5, Wichita 2, Young 1, Callahan 1, Shackelford 1, and Stephens 2.

NORTH CENTRAL TEXAS SUCCESSFUL WILDCAT

Cooke County: A. V. Grant 1 W. Hyman, P. P. Anderson Sur. A-24, 10 mi. NE St. Jo, pumped 98 bbl. of oil per day, oil sand 2,240-45 ft. TD.

NORTH CENTRAL TEXAS WILDCAT FAILURES

Archer County: L. T. Burns 1 S. I. Hayter, Sec. 2,436, TE&L Sur., 2 mi. E Megargel, dry, TD 5,202 ft., sand with slight show 3,876-82 ft. and 4,229-33 ft., Caddo lime with show of oil 4,627-34 ft.

Neeld & Hood Drilling Co. 1 J. R. Parkey, Blk. 3, ATNCL Sur., 3½ mi. SE Mankins, dry, TD 1,694 ft. in shale.

Clay County: C. V. Mangrem & J. E. Gray Drilling Co. 1 G. D. Rigsby, Blk. 13, Specht & McCutchen Subd., 4 mi. W Charlie, dry, TD 2,719 ft. in lime, no shows.

Cooke County: Star Oil Co. 1 C. L. Lloyd, S. Hernandez Sur., 1½ mi. NW Bulcher, dry, TD 2,925 ft., pre-Cambrian 2,916 ft., no shows.

Montague County: D. H. Bolin 1-B E. Howard, Blk. 70, Kaufman County School Land Sur., 4 mi. S Spanish Fort, dry, TD 3,260 ft. in lime.

Wichita County: Scott Bros. 15 B. F. Dutton, Blk. 12, Denton School Land Sur., Lodge 4, 3 mi. NE Holliday, dry, TD 1,841 ft., sand with odor 706-14 ft.

Frank Wood 1-C S. B. & T. R. Bennett, Sec. 16, W. W. Carroll Sur., A-436, 3 mi. SE Electra, dry, TD 1,905 ft. in shale and sand.

Wilbarger County: L. A. Helms 1 H. B. Dockery, Sec. 14, Blk. 15, H&TC Sur., 8 mi. N Vernon, dry, TD 2,200 ft. in lime.

WEST CENTRAL TEXAS WILDCAT FAILURES

Callahan County: Ungren & Frazier 1 J. A. Sikes, Sec. 226, E. Mather Sur., 7 mi. W Cottonwood, dry, TD 1,115 ft. in lime and shale.

Comanche County: J. C. Hamer 1 Frances E. Mulloy, NW cor. Oleta & D. W. Cheek Tr., Howland Sur., 6 mi. SE May, dry, TD 922 ft. in sand.

Jones County: A. C. McGahley et al 1 J. F. Goodwin, Sec. 9, Blk. 2, T&NO Sur., 3 mi. SE Anson, dry, TD 3,810 ft., Dotham 1,895 ft., Saddle Creek 2,210 ft., Coal 2,260 ft., sand with show of oil 2,382 ft. and 2,398 ft., lime with slight show of oil 3,805-10 ft., elev. 1,786 ft.

Stephens County: Russell Maguire et al 1 J. A. Louderdale, Sec. 2,963, TE&L Sur., 10 mi. S Breckenridge, dry, TD 3,628 ft., Caddo 3,472 ft., no shows.

EASTERN TEXAS

Cherokee County Wildcat Proves Disappointing

DALLAS.—Two wildcats that have attracted considerable interest, had disappointing results, according to last reports. In Cherokee County, 5 miles west of the William Wise field, General Crude Oil Co. 1 Summers Estate, resumed testing after several weeks of title work. Pipe was set to 5,143 ft. in the Woodbine, and when plug was drilled it flowed 5 bbl. of 43°-gravity oil an hour for 2 hours and died. Tubing pressure was 450 psi., and casing pressure 90 psi. It was shut in overnight to build up pressure but when opened, would not flow. Operators were trying to swab.

Six miles south of Wills Point in Van Zandt County, J. M. DeuPree 2 Bruce, W. H. Matthews Survey, showed possibilities of oil and gas on electric log ran to the Goodland limestone at 5,558 ft. However, a 60-minute drill-stem test from 5,534-82 ft. recovered 10 ft. of mud, with no shows. Operators were drilling ahead to the Paluxy, expected around 5,620 ft. DeuPree's well is said to be running about 11 ft. low on the Goodland, in correlation with an old test 5 miles to the north, and 21 ft. low on base of the Woodbine. Elevation is 454 ft.

In Smith County, Magnolia Petroleum Co. was coring deeper after cores from 9,536-38 ft. in gray limestone showed pinpoint porosity, and a slight rainbow show of oil in sandy lime between 9,546-51 ft. A drill-stem test at 9,517-36 ft., open 2 hours and 15 minutes, produced a slight blow at

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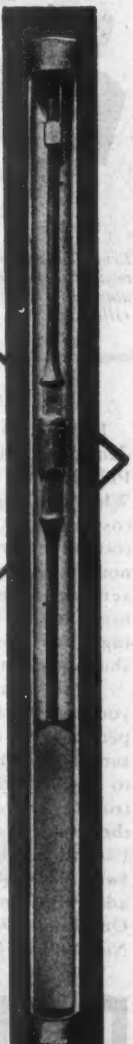

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the surface, increasing to about 3 psi., and recovered 90 ft. of gas-cut mud having good odor but no oil shows. Shut-in bottom-hole pressure was 3,850 psi. in 30 minutes.

Three miles west of San Augustine, D. H. Byrd et al 1 T. W. Blount was drilling below 7,375 ft. in shale and limestone. Operators' reported sample tops were Austin 4,630-45 ft. to 4,945-60 ft., Comanchean limestone 4,990-5,005 ft., tentative base of the Edwards 5,405-20 ft., and top of the upper Glen Rose 5,495-5,510 ft.

In Harrison County, W. C. Feazel 1 George Bishop, 3½ miles north of the Elysian fields, was coring below 5,920 ft. in hard blue shale. At 5,180-97 ft., the last 1½ ft. recovered was dark gray limestone with oil stains. Cores at 5,197-5,204 ft. recovered 4 ft. of hard tight limestone, with no shows. Operators then drilled out to 5,920 ft. Top on the Massive anhydrite was logged at 4,649 ft., and top on the Hill was placed at 5,193 ft. by cores.

In Cass County, Shell Oil Co., Inc., 1 Gerald Smith, 2½ miles west of Bloomburg, was drilling below 8,423 ft. in sandy limestone. Sample tops placed the Pettit at 6,910 ft., and the Travis Peak at 7,640 ft. No shows were reported. In Kaufman County, 4 miles southwest of Cedarville, Shell's 1 F. E. Lumpkin was drilling below 7,640 ft. in lime and shale.

New locations totaled 18 for the week. By counties, they were: Angelina 1 wildcat, Cass 1 wildcat, Cherokee 1 wildcat, and 1 outpost test to the William Wise field, Henderson 2 in Tri-Cities field, Lamar 1 wildcat, Marion County 3, McLennan County 1 shallow cable tool test, and Wood County 6 development wells and 1 outpost northeast of the Norman-Paul field

Development completions for the week, by fields, were: Opelika 1, Grapeland 1, Carthage 3 gas wells, Joaquin 1 gas well, Sand Flat 1, Hawkins 1, and Norman-Paul 1.

On the southeast flank of the Carthage gas field, Panola County, Sun Oil Co. completed its 1 John Smith-Frost Unit, S. M. C. Hooker Survey, as a dual completion oil well in the Travis Peak and Lower Pettit. Perforations in the lower Pettit were between 5,902-14 ft., from which it flowed 434 bbl. of 40.9°-gravity oil in 36 hours through ¼-in. choke. Flowing pressure was 350 psi., with a gas-oil ratio of 650 cu. ft. Travis Peak perforations were at 6,086-92 ft., from which it flowed 215 bbl. of 42°-gravity oil in 22 hours through ¼-in. choke. Gas-oil ratio was 710 cu. ft., on tubing pressure that ranged from 300 to 350 psi.

EAST TEXAS WILDCAT FAILURE

Cass County: Ark.-La. Oil Co. 1 Brooks, Eli D. Hanks Sur., 5 mi. NE Bivins, dry, TD 7,200 ft., Nacatoch 1,574 ft., Pecan 2,346 ft., Goodland 3,562 ft., Paluxy 3,686 ft., Travis Peak 6,990 ft., elev. 225 ft., no shows.

Denton County: The Texas Co. 1 C. Saunders, J. Ayers Sur., A-2, 4½ mi. S Sanger, dry, TD 2,508 ft., top conglomerate 2,290 ft., swabbed 15 bbl. oil and 20 bbl. water in 8 hours from perforations at 2,410-13 ft.

Falls County: John W. Myers 1 Mrs. W. Westbrook, Marlin Sur., 2 mi. S Marlin, dry, TD 1,763 ft.

Hunt County: Hunt Oil Co. 1 Naud Burnett, Henry Jones Sur., A-554, 6 mi. NW Lone Oak, dry, TD 4,669 ft., Georgetown 3,748 ft., elev. 503 ft.

Navarro County: L. O. Kelsey et al 1 E. D Smith, M. Atury Sur., 10 mi. SE Corsicana, dry, TD 3,133 ft., sample tops: Nacatoch sand 886-916 ft., Wolf Creek sand 1,738-62 ft., Austin 2,345-2,540 ft., Eagleford shale 2,540-2,967 ft., Woodbine sand with water 3,014-40 ft., elev. 369 ft.

Wood County: W. H. Bryant 1 J. G. Shamburger, W. H. Secrest Sur., 8 mi. NE Quitman, dry, TD 4,770 ft., Austin 4,055-4,136 ft., by samples.

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OKLAHOMA

Wildcat Near East Lindsay Looks Good

SUPERIOR OIL CO. 1 I. L. McDaniel, C NW SW 15-4n-4w, wildcat 3½ miles southwest of East Lindsay field and 1 mile south of Lindsay, Garvin County, recovered 225 ft. of heavily oil and gas-cut mud from 55-minute drill-stem test at 8,130-63 ft. Well made gas in 42 minutes, flowing bottom-hole pressure was 75 psi. and shut-in pressure was 2,325 psi. after 10 minutes. Superior cored from 8,163-79 ft. recovering 10 ft. of medium-grained sand bleeding oil, some shale partings, and 3½ ft. of calcareous, medium-grained sand with staining and odor.

Edward P. Baker 1 Ficken, C E½ SW NE 8-19n-4w, wildcat 1 mile northeast of Marshall pool, northwestern Logan County, had shows in core and drill-stem test of second Wilcox. Core from 6,380-89 ft. recovered porous sand with light staining and strong odor. A 45-minute drill-stem test at 6,370-89 ft. blew gas throughout and recovered 120 ft. of gas-cut mud which was slightly oil-cut.

Zephyr Drilling Co. 1 Banning, NE SE SE 36-9n-1e, Cleveland County wildcat 5 miles north of West Burnett pool, had electric log "kick" in Bois d'Arc at 5,382-455 ft. and casing is being run for test.

The Texas Co. 1 Hutson, SW SE SW 31-4n-5w, Knox field outpost, Grady County, swabbed 1½ bbl. of oil per hour with some water after being plugged back to 5,618 ft. Test was drilled to 6,224 ft. and casing set at 5,655 ft. Sand section around 4,690 ft. has not been tested.

Stanolind Oil & Gas Co. 1 Briscoe Unit, C NW SE 4-4n-5w, deep Grady County prospective discovery well, cored 9 ft. of hard, tight sand with staining and oil odor from 14,080-89 ft. and is coring ahead. Test flowed oil from pay at 13,634-875 ft.

Cotton County maintains its position as the state's "hot spot" with 9 locations and 12 completions, including 8 oil wells, for

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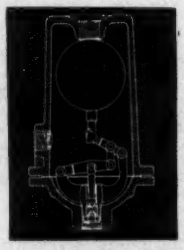

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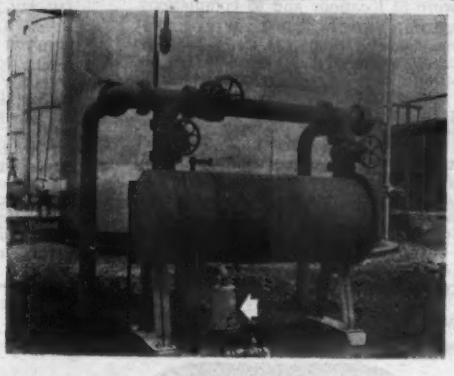

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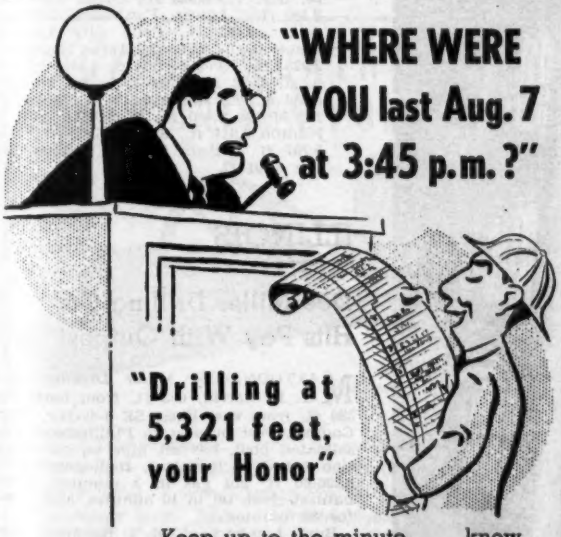

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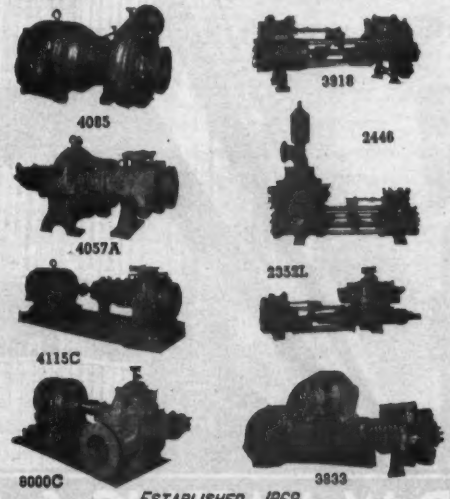

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the week. Garvin and Stephens were also active areas with 7 locations and 8 completions for Garvin and 4 locations and 9 completions for Stephens. State totals for week were 52 locations and 68 completions.

OKLAHOMA SUCCESSFUL WILDCATS

Beckham County: Shell Oil Co. 1 Walters, NE SW 14-10n-21w, flowed 469 bbl. of distillate per day from granite wash at 9,260-9,360 ft. through 20/64-in. tubing choke; TD 13,133 ft., tops to be released.

Cotton County: Duncan 1 Jones, SW SW NW 24-2s-11w, pumped 60 bbl. of 35°-gravity oil per day from sand at 1,878-87 ft., TD 1,887 ft., no tops reported.

Oklahoma County: Peppers 1 Hayes-Witcher, C SW SE 32-13n-2w, pumped 75 bbl. of oil per day from Bois d'Arc at 6,276-6,332 ft., TD 6,332 ft.

OKLAHOMA WILDCAT FAILURES

Caddo County: Superior 51-11 Weller, NW NW NE 11-8n-12w, dry, TD 17,823 ft., Herrington lime 3,950 ft., Deese 10,610 ft., Dornick Hills 15,525 ft., Springer 16,418 ft.

Carter County: Toklan Royalty 1 Carroll, SW SW NW 32-5s-1e, dry, TD 4,327 ft., Deese 3,320 ft., sandy lime 4,209 ft., Simpson 4,250 ft.

Comanche County: Mid-Continent 1 Craig, NW NW NE 26-1n-11w, dry, TD 2,268 ft., Arbuckle 2,056 ft.

Cotton County: Peterman 1 High et al, NW NW NW 35-2s-11w, dry, TD 2,547 ft., no tops reported, no shows.

Bridwell 2 Henderson "A," S/2 S/2 SE SE 23-3s-11w, dry, TD 1,531 ft., broken sand 1,453-65 ft. with slight show of oil, sand 1,465-85 ft.

Garvin County: Kingery 1 Boosa, SE SE SE 25-4n-1e, dry, TD 3,760 ft., Hogshooter 3,143 ft., McKenna sand 3,210 ft., Burns sand 3,240 ft., Basal Pennsylvanian-Bromide 3,475 ft., first sand 3,600 ft.

Harmon County: Dillard 1 Motley, SE NE SW 31-3n-25w, dry, TD 3,005 ft., lime 2,706-16 ft., with show of gas.

Hughes County: Van Patton 1 Witty, SW SW NE 30-8n-9e, dry, TD 2,876 ft., Calvin 870 ft., coal 1,320 ft., brown lime 2,642 ft., second Booch 2,815 ft.

Jefferson County: Akin & Dimock 1 Gabriel, SW SW NE 25-3s-9w, dry, TD 2,730 ft., no tops reported, no shows.

Kingfisher County: Amerada 1 Oltmanns, SW SW SE 23-18n-5w, dry, TD 7,052 ft., Oswego 5,894 ft., Mississippi lime 6,296 ft., Woodford 6,832 ft., Sylvan 6,966 ft., Viola 7,042 ft.

Noble County: Rumley 1 Madden, NW NW NW 35-21n-2w, dry, TD 5,420 ft., no tops reported.

Okfuskee County: Mid-Continent 1 Foster, SW SW NE 13-10n-9e, dry, TD 3,424 ft., Senora sand 1,660 ft., Bartlesville 2,060 ft., Booch 2,719 ft., Wapanuca 3,309 ft., Cromwell 3,323-78 ft.

Oklahoma County: Magnolia 1 Ramsey, C NW SW 33-14n-1e, dry, TD 5,741 ft., Hogshooter 3,985 ft., Layton 4,020 ft., Checkerboard 4,280 ft., Oswego 4,815 ft., Prue 4,940 ft., sand 5,138 ft., Mississippi lime 5,300 ft., Woodford 5,325 ft., Sylvan 5,428 ft., Viola 5,535 ft., Wilcox 5,620 ft., second Wilcox 5,710 ft.

Pawnee County: Peters 1 Foster, SW SW SW 31-21n-4e, dry, TD 4,388 ft., conglomerate 3,326-3,418 ft., Oswego 3,360 ft., Bartlesville 3,861-84 ft., Misener 4,279 ft., Wilcox 4,321-29 ft., second Wilcox 4,352-88 ft.

Pottawatomie County: Harper 1 Ackenman, NW NW SE 9-6n-5e, dry, TD 4,411 ft., Calvin 2,585 ft., Senora sand 2,980-95 ft., Earlsboro 3,100-12 ft., Cromwell 3,300-95 ft., Mayes 3,965 ft., Woodford 4,070 ft., Hunton 4,313 ft., Sylvan 4,368 ft.

Deep Rock 1 Homer, NW SE NE 18-10n-2e, dry, TD 6,079 ft., no tops reported.

Woods 1 Guderian, SE NW NW 12-10n-4e, dry, TD 4,926 ft., second Wilcox 4,910 ft.

Suntex 1 Wheeler, NE NW NE 33-11n-2e, dry, TD 6,028 ft., Upper Pawhuska 2,100 ft., Lower Pawhuska 2,229 ft., Avant 3,463 ft., Belle City 3,553 ft., Lower Belle City 3,719 ft., Hogshooter 3,920 ft., Checkerboard 4,254 ft., Oswego 4,998 ft., Prue 5,004 ft., Verdigris 5,080 ft., Earlsboro 5,217 ft., Inola 5,378 ft., Mayes 5,440 ft., Woodford 5,483 ft., Hunton 5,611 ft., Sylvan 5,695 ft., Viola 5,797 ft., Wilcox 5,911 ft., second Wilcox 6,001 ft.

ILLINOIS

Dee Miller Drilling Co. Hits Pay With Outpost

MATTOON.—Dee Miller Drilling Co. 1 G. P. Calvin, 605 ft. from north and 330 ft. from east lines, SE 6-4s-11w, White County, west outpost to Phillipstown Consolidated pool, has set pipe on oil saturation found in Rosiclare. Drill-stem test of 3,030-60 ft. got gas in 3 minutes, flowed natural clean oil in 10 minutes, and flowed for 25 minutes.

Burr Lambert et al 1 Robinson Heirs et al, SW SE NE 27-3s-10e, White County, 1¼-mile outpost to Grayville pool, pumped 65 bbl. of oil in 21 hours on pump test of lower Cypress sand at 2,854-64 ft. Well was shot with 30 qt.

Calvert & Willis and Aurora Gasoline Co. 1 Thomas Bemis, SE SW SW 11-3n-8e, Clay County, ½-mile outpost to Clay City Consolidated pool, has set casing on oil zone in Rosiclare lime at 3,000-05 ft. A 1-hour drill-stem test got gas in 10 minutes and 800 ft. of clean oil. A 2-hour drill-stem test got gas in 1 hour, 210 ft. of oil, and 30 ft. of oil-cut mud.

Wayne, Clay, and Wabash counties led state in completions for week with 9, 8, and 6 for 22 out of state total of 49. Clay and Wabash were also leaders in drilling per-

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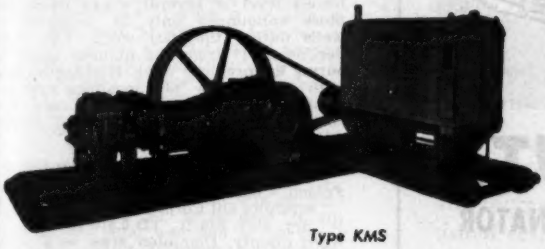

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ROBINSON · ILLINOIS

mits granted with 9 and 8 out of state's total of 55 for week.

ILLINOIS WILDCAT FAILURES

Coles County: Zink 1 Boles, NE SE SE 3-12n-9e, dry, TD 2,185 ft.

Edgar County: Banks et al 2 Honnold, SE NW NW 1-13n-14w, dry, TD 280 ft.

Franklin County: Staley Oil Co. 1-B Staley-Harrison, NE NE SE 26-5s-1e, dry, TD 2,765 ft.

Gallatin County: Brehm 1 Maye, NE NW NE 34-7s-9e, dry, TD 3,133 ft.

Jersey County: Kerwin 1 Legate, SW SW SE 2-6n-13w, dry, TD 2,680 ft.

Madison County: Talbot et al 1 Hosto, SW SE SE 7-5n-6w, dry, TD 2,422 ft.

Marion County: Doran 1 Charlton, SW NW SW 25-3n-1e, dry, TD 1,805 ft.

Shelley County: Nation Oil 1 Lipke, SE NE NE 28-11n-3e, dry, TD 1,820 ft.

Wayne County: Slape 1 Yates, SE SW SE 29-2n-7e, dry, TD 3,179 ft.

National Associated 1 Donoho, SW SE SW 18-1n-5e, dry, TD 3,020 ft.

Robinson & Puckett 1 Meyer, SE SE NW 16-3s-8e, dry, 3,548 ft.

White County: National Associated & Ashland 1 Stahl, E½ SE SE 25-3s-8e, dry, TD 3,559 ft.

CALIFORNIA

Structural Problems Encountered at Bacon Hills

LOS ANGELES.—Efforts of the Seaboard Oil Co. and Bandini Petroleum Co. to develop a major oil field at Bacon Hills in Kern County were further hampered during the past week when their present test there, 26-21 Seaboard-Bandini, 21-28s-20e, ran into structural complications. The well, currently drilling ahead at 6,265 ft., is running approximately 850 ft. higher structurally than original geological calculations indicated. Apparently the well is on the wrong side of a known fault in the area and has many prospects of finishing as a dry hole. There is a chance that it may drill through the fault and end up on the same side as the discovery well, but if it does, this will have to occur within the next few feet. Unless the fault is crossed, the oil sand is expected at approximately 7,300 ft. In other wells in the field the producing zone has been found near the 8,000-ft. level.

Seaboard and Bandini previously have experienced considerable trouble in getting the Bacon Hills wells to produce. The discovery well, completed earlier this year, indicated a very high rate of production when originally brought in. It subsequently died, however, and was brought back onto production at about 180 bbl. per day. The companies also experienced some water difficulties with this well. None of the few wells completed in the field since the discovery well have shown any tendency to make more than fair producers.

Standard Oil Co. of California was one step nearer conclusive results at their important deep test in the Middle Dome area of Kettleman Hills last week, when water shut-off test at 12,072 ft. proved successful. With this job out of the way, Standard is now preparing to drill ahead to a depth comparable with the original hole which went to 12,389 ft. for Eocene discovery. Known as the 73-30V, and located in 30-23s-19e, the well originally flowed commercial quantities of oil through drill pipe, but was incapable of revealing its true capacity due to the fish in the hole.

The Texas Co. 1 Rosenberg, 27-22s-10e, in the San Ardo area of Monterey County, was nearing completion at the close of the week as the company ran liner preparatory to inaugurating production tests. This well is a follow-up to the company's 1 Lombardi, which was completed 2 weeks ago as the discovery well of the first commercial oil production in Monterey County. The 1 Rosenberg was carried to a total depth of 2,378 ft. but was plugged back to 2,100 ft. in oil sand. Casing is cemented at 2,080 ft. Indications so far promise a productive capacity about equal to that of the discovery well. This was 84 bbl. of oil daily.

New locations in California reached their lowest level of several weeks when operators announced only 34 proposed new wells during the past week. This was a decline of 17 from the number announced during the previous week. Huntington Beach with five of the new locations and Long Beach with three were the only fields receiving a significant number of proposed new wells.

CALIFORNIA WILDCAT FAILURES

Fresno County, Northeast Coalinga area: Sharples Oil Corp. 88-18 Lillis, 18-18s-15e, dry, elev. 845 ft., TD 5,578 ft.

Kern County, Dominion area: J. H. Mauer and Arthur C. Fisher 5 Jean, 15-26s-28e, dry in basement, elev. 1,000 ft., top schist 1,045 ft., TD 1,050 ft.

McKittrick area: Pacific Western Oil Corp. 85-30 Rankin, 30-30s-22e, dry, swabbed water with scum of oil at 4,758 ft., TD 6,288 ft.

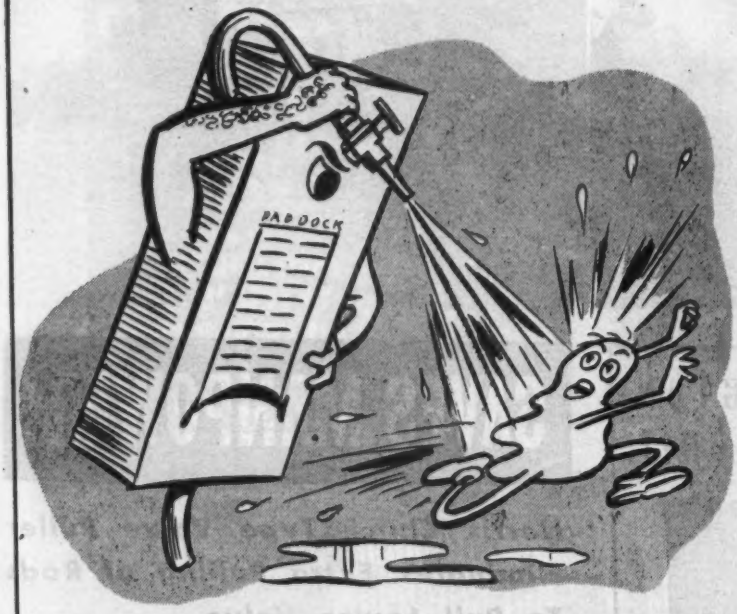
Mount Poso area: Kendall, Donald and associates 1 Dennis-Hooper, 36-26s-27e, dry, elev. 1,048 ft., top Grit 2,514 ft., Vedder 2,530 ft., oil showings reported in Jewett and Vedder, TD 2,568 ft.

Mountain View area: Mar-Roo Syndicate 1 Petromont, 29-30s-29e, dry in gray, oil-stained sand, elev. 422 ft., top Santa Margarita 4,984 ft., Transition 4,876 ft., TD 4,995 ft.

Marin County, Bolinas area: L. M. Lockhart 1 Trevis, 7-1n-8w, dry, elev. 416 ft., TD 5,123 ft.

Solano County, Kirby Hills area: Bishop Oil Co. 1 Bishop-Calaveras-Triguero, 5-3n-1e, dry, elev. 45 ft., TD 5,090 ft.

Ventura County, Seape area: Kirk Oil Co. 1 Edwards, 27-4n-19w, dry, elev. 1,057 ft., TD 3,190 ft.



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PERMIAN BASIN

Ector County Test Finds Clear Fork Pay

MIDLAND.—Clear Fork production at The Texas Co. and Phillips Petroleum Co.'s offset test to the Frank Cowden Ellenburger discovery, northwestern Ector County, was indicated when the well made a successful drill-stem test in that formation. The 2 J. F. Cowden, Section 7, Block 44, T&P Survey, and northwest of the discovery, took an 80-minute test at 6,160-6,240 ft., showing gas at the surface in 4 minutes, mud in 30 minutes and oil at the end of 33 minutes. It was allowed to flow into tanks for 30 minutes, gaging 8½ bbl. of 38°-gravity oil. Operators then continued drilling to the Ellenburger.

In Crane County, Gulf Oil Corp. completed its 101-E Waddell, Section 27, Block B-25, PSL Survey, as a confirmation well ½ mile north of its 1-HH University, discovery of the University-Waddell field.

Other development wells, by fields, were: Adair 2, Barnhart 1, Dunes 1, Fullerton 2, Garza 4, Keystone Silurian 1, Levelland 3, McElroy 1, North Ward-Estes 1, North Riley 1, Penwell 1, Pecos High Gravity 1, Russell 1, Sand Hills Tubb 1, Slaughter 3, Toborg 3, TXL Clear Fork 1, TXL Ellenburger 2, Three-Bar 1, and Wasson 1.

In southeastern Reeves County, Argo Oil Corp. 1 Ikins reported a show of gas in the Delaware sand. A 3-hour drill-stem test at 5,204-40 ft. resovered 100 ft. of slightly gas-cut mud but had no shows of oil. The 1 Ikins is approximately 1 mile south of the same company's Verhalen discovery, which produces from the Wolfcamp around 9,900 ft. Operators plan to drill to 11,000 ft. if necessary to test the Wolfcamp. The 1 Ikins topped the Delaware sand at 5,164 ft., on an elevation of 2,930 ft.

Phillips Petroleum Co. 2 Blakeney, on the north side of the Goldsmith Clear Fork field of Ector County, will be carried to the Ellenburger, according to reports. It was originally scheduled to 6,200 ft., but was drilling ahead below 8,228 ft. in lime and shale. One-half mile south and ¼ mile west of the Frank Cowden Ellenburger discovery, Phillips Petroleum Co. was rigging up rotary at the 1 Frank Cowden, an old well abandoned at 4,470 ft. in 1935. It will be deepened to 8,650 ft. Location is Section 18, Block 44, T1N, T&P Survey.

In Coke County, Sun Oil Co. 1 C. L. Mathers showed prospects of extending production to the southwest at the Jameson field when it recovered 85 ft. of heavily oil and gas-cut mud, plus some distillate, in a drill-stem test. It was the well's first drill-stem test of reef limestone at 5,940-60 ft., and the tool was open 30 minutes. Flowing bottom-hole pressure was 550 psi., increasing to 2,650 psi. when shut in. Oil content of the mud was said to be about 10 per cent. Sun's 3 Homer H. Jameson, fourth Ellenburger failure for the field, was at plugged-back total depth of 6,501 ft. Operators were testing between 6,486-6,501 ft., where it recovered 90 ft. of oil and gas-cut mud, and 30 ft. of heavily oil and gas-cut mud. Sun's 1 J. B. Walker, Ellenburger test 4 miles southwest of the field, in the C. Brockhuysen Survey, was drilling below 5,598 ft. in shale.

In east-central Upton County, 12 miles northeast of Rankin, Slick-Urschel Oil Co. et al 1 Alford, Ellenburger test, perforated between 11,885-910 ft., 11,945-960 ft. and 11,975-985 ft. It was swabbed down 8,500 ft. but did not refill and operators were to acidize the three sets of perforations.

WEST TEXAS SUCCESSFUL WILDCATS

Crane County: ½-mile N extension to University-Waddell field—Gulf Oil Corp. 101-E Waddell, Blk. 27-B-25, PSL Sur., 4 mi. N of Block 31 field, flowed 1,104 bbl., Ellenburger 10,710 ft., TD 10,835 ft.

Regan County: Continental Oil Co. 1 University B-6, Sec. 8, Blk. 49, University Lands, 2½ mi. SW Barnhart field, swabbed 7 bbl. 32°-gravity oil per day, San Andres 2,280 ft., TD 2,465 ft.

WEST TEXAS WILDCAT FAILURES

Ector County: Humble Oil & Refining Co. 1 Earl Vest, Sec. 17, Blk. B-8, PSL Sur., on W. county line and 7½ mi. from S line, dry, TD 11,667 ft., base Permian 7,900 ft., top Devonian 9,200 ft., Ellenburger 11,485 ft., elev. 2,945 ft.

Regan County: Gulf Oil Corp. 1-E Zulette Hughes, Sec. 8, Blk. L, TCRR Sur., 1 mi. NE Stiles, dry, TD 10,779 ft., Yates 1,650 ft., Grayburg 2,685 ft., Glorietta 3,440 ft., Strawn 9,490 ft., Devonian 9,900 ft., Ellenburger 10,389 ft., by samples, elev. 2,557 ft.

Ward County: Gulf Oil Corp. 1-S Bray "A," Sec. 6, Blk 5, H&TC Sur., 2 mi. NE Grand Falls, dry, TD 8,170 ft., San Angelo 3,890 ft., Tubb 5,820 ft., Woodford 6,530 ft., Devonian 6,700 ft., Silurian shale 7,652 ft., Montoya 8,080 ft., elev. 2,505 ft.

TEXAS PANHANDLE WILDCAT FAILURE

Lamb County: Seaboard Oil Co. of Delaware 1 A. W. Jackson, Lab. 15, Lodge 680, State Capitol Lands Sur., SW cor. of county, dry, TD 9,327 ft. in Cambrian, San Andres 3,510 ft., Glorietta 3,724 ft., Tubb 5,790 ft., Ellenburger 9,078 ft., Cambrian 9,257 ft., elev. 3,713 ft., no shows.

SOUTHEASTERN NEW MEXICO

HOBBS.—Magnolia Petroleum Co. 14 E. O. Carson, NW NE NW 33-21s-37e, extended production ½ mile to the northeast of the Drinkard field, Lea County, flowing oil from the McKee limestone of the Simpson, middle Ordovician. The first test, at total depth of 7,740 ft., was between 7,600-30 ft. Gas came to the surface in 2½ minutes, oil in 8½ minutes, and after cleaning into pits for 12 minutes, it gaged 99.7 bbl. of 45.5°-

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gravity oil in 1½ hours. Gas-oil ratio was 1,052 cu. ft. On a test from 7,630-63 ft., the well flowed 119.6 bbl. of oil in 75 minutes. From 7,740-70 ft., open 1¾ hours, it flowed 37.8 bbl. of oil an hour. Operators were to drill ahead to test the entire pay section.

In northeastern Lea County, Mid-Continent Petroleum Corp. 1-A Sawyer, 27-8s-36e, has been shut down for orders at 8,696 ft., in shale, lime and anhydrite. No shows have been reported.

Amerada Petroleum Co.'s deep test in the Monument field, Lea County, was unofficially reported in the pre-Cambrian at total depth of 9,958 ft. Operators were said to be testing, but no information was forthcoming. The same company's 2 Record, 12,000-ft. test in 25-19s-35e, was drilling below 9,826 ft. The last reported drill-stem test was between 9,401-41 ft., where it recovered 150 ft. of heavily oil and gas-cut mud in 4 hours.

ROCKY MOUNTAIN

Biggest Strike of the Year Still Flowing at High Rate

DENVER.—The Rocky Mountain area has had some notable discoveries this year, but indications point to one of the first, on the Neiber Dome, in Washakie County, Wyoming, as probably the largest and most important. The discovery well has been out on production, and is flowing 930 bbl. per day through a ⅜-in. choke from the Embar sand with a flowing pressure of 1,410 psi. Following its completion in January, considerable trouble was encountered in producing it because of expanding pressure freezing up the tubing and casing. Hot oil was employed in overcoming this difficulty, but now the well is producing normally without using that expedient.

The discovery was G. & G. Drilling Co. 1 Government, SE NE NW 19-45n-92w, joint with the California Co. The operator, composed of R. S. Shannon, president of the Pioneer Oil Corp., and Gifford Parker, of the Parker Drilling Co., own a 50 per cent interest in the operation. The well was drilled to 10,980 ft., going into the Madison at 10,736 ft., and plugging back to 10,189 ft. for completion in the Embar. Top of the Embar was at 10,025 ft., and elev. is 4,495 ft. The oil runs around 40°-41° gravity. In addition to the discovery in the Embar, it opened up large gas reserves in the Wall Creek sands, and in a sand in the Cody shale. The dome is a very large structure with 14,558 acres within the unit, and consists of three highs.

Northwest Elk Basin.—A new light oil pool in upper formations appears imminent in Sinclair-Wyoming Oil Co. 1 Helen, SE NE NE 29-9s-23e, Northwest Elk Basin, Carbon County, Montana. The well is located ¼ mile west of same company's 1 Wilkins, a discovery in the Madison last July, making 4,942 bbl. per day at 6,795 ft., total depth. The Wilkins showed saturation in the Frontier and Dakota on the way down to the objective, but no production test was made. The second well was drilled to test these horizons. Total depth is 3,451 ft., ground elevation 4,400 ft. The 7-in. was set at 3,376 ft., with 2⅞-in. tubing at 3,447 ft. In a swabbing test it made 87 bbl. of oil in 18 hours. The horizon was not identified, but probably is the second Wall Creek in the Frontier formation.

Douglas Creek area.—Two of the three wildcats drilling on three separate structures in the Douglas Creek area, south of the Rangely field, Rio Blanco County, Colorado, have been abandoned. Superior Oil Co. 2 Government, SE NW SW 33-2s-101w, Douglas Creek, joint with Continental and Union Oil companies, was abandoned at 5,051 ft. It was located 1¼ miles northeast of the discovery well, completed in 1943 in the Dakota-Lakota for 9,700,000 cu. ft. of gas at 4,326-4,420 ft. after plugging back from the Weber. General Petroleum 1 Government, C NE SW 24-2s-103w, West Douglas Creek, was abandoned at 8,864 ft. after testing the Weber. It was located 7 miles west of the Douglas Creek test. Texas Co. 1 Unit, NW SE NE 9-2s-101w, North Douglas Creek, is bottomed at 5,512 ft. The Dakota, top at 5,087 ft., was barren. The land in the three units runs up to the southern boundary of the Rangely field.

New operations.—Twenty-three new operations were reported, of which 10 were in Colorado, 7 in Wyoming, 5 in Montana, and 1 in northwest New Mexico.

Completions.—Twenty wells were completed, of which 12 were oil wells for 3,219 bbl., 3 were gas wells, and 5 were dry holes. Colorado had 7 completions in the Rangely field for 2,010 bbl., and 2 dry wildcats. Wyoming had 2 oil wells in Mush Creek for 316 bbl., 1 in Hamilton for 280 bbl., 1 in Gebo for 600 bbls., and 2 dry wildcats. Montana had 1 oil well for 13 bbl., 3 gas wells, 1 dry hole, and no wildcats.

WILDCAT FAILURES IN COLORADO

Douglas Creek, Rio Blanco County: Superior Oil Co. 2 Government, SE NW SW 33-2s-101w, TD 5,051 ft., dry, Dakota 4,513 ft., Morrison 4,644 ft., elev. 6,006 ft. KB.

West Douglas Creek, Rio Blanco County: General Petroleum Corp. 1 Govt. C NE SW 24-2s-103w, TD 8,864 ft., dry, Dakota 5,368 ft., Morrison 5,928 ft., red beds 7,023 ft., Weber 7,752 ft., elev. 6,516 ft. ground.

WILDCAT FAILURE IN WYOMING

Fiddler Creek, Weston County: Clark Drilling Co. 1 Martin, C NW NW 6-45n-64w, TD 5,044 ft., dry, Newcastle sand missing.

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OHIO, KENTUCKY

Muskingum County Gets Large Gas Well

COLUMBUS.—Salem Petroleum Co. 3 James Ford, Section 1-E, Newton Township, Muskingum County, came in at 9,800,000 cu. ft. of gas natural. Clinton sand was topped at 3,616 ft. and drilled in to 3,655 ft. This well is by far the largest gas well to be completed in this township, which is noted for its spotty condition.

Wasson Co. moved ½ mile east of its 1 Orville Downing for the second well on the lease, Section 36, Salt Creek Township, Muskingum County. Clinton sand at 4,458-91 ft. gaged 490,000 cu. ft. of gas natural and 1,629,000 cu. ft. when shut in the casing after shot. The Medina sand, at 4,579-89 ft., was dry.

Another good well in southwest Hopewell Township, Perry County, was brought in by Underwood et al on 1 Fred Leckrone, Section 29. The Clinton was reached at 2,889 ft. and drilled in to 2,914 ft., where the gage was 1,600,000 cu. ft. of gas natural.

Medina gas sand in the west end of York Township, Morgan County, will probably cover an area of 2 miles east and west. Clyde Foraker et al 2 Andrew Komaromy, Section 22, had only a show of oil in the Clinton, and was drilled down to the Medina sand at 3,894-3,902 ft. where it gaged 112,000 cu. ft. of gas natural. The well is 1 mile west of present production.

On the west edge of Navarre, Jordon et al 1 Phillip Keller, Section 5, Bethlehem Township, Stark County, made 1,017,000 cu. ft. of gas natural in the Clinton sand, but the operator is now fishing for casing which collapsed when the well was shot. Clinton reported at 4,189-4,270 ft., with the pay at 4,245-70 ft.

A second Newburg sand well was completed in Jackson Township, Knox County. Shuff & Bucy 1 Sarah Cotrell, Section 7, topped the sand at 2,479 ft. and found 489,000 cu. ft. of gas at 2,483-94 ft.

In the Corning Grade field, Dunmar Oil Co. 3 J. W. Ashcraft, Section 20, Fallsbury Township, Licking County, found the Clinton at 2,872-2,908 ft. with a good showing of oil. The well made 58 bbl. in 24 hours after shot.

New locations declined for the second straight week. Only 12 were reported with 2 each in Knox, Noble and Monroe counties. Stewart field led in completions with 6 out of a total of 32.

OHIO SUCCESSFUL WILDCAT

Morgan County, Deerfield Township: Underwood et al 1 Lawrence Wiseman, Sec. 14, Clinton 4,290-4,324 ft., 200,000 cu. ft. of gas, TD 4,397 ft.

WESTERN KENTUCKY

OWENSBORO.—It is reported that Pure Oil Co. is planning a deep test to Knox dolomite in Sebree area of Webster County. Knox dolomite is expected around 6,500 ft.

Joe Reznik 1 T. H. Brown, 10-L-23, wildcat 2½ miles west of Slaughters pool, has reached 2,303-34 ft. without topping Tar Springs sand which produces at Slaughters. Three other Webster County wildcats are drilling. They are Lynch Oil Co. 1 O. G. Sutton, 14-M-23, 4 miles northeast of Dixon; George E. Engle and Century Pipeline 1 Wimstead, 1-L-24; and same operator's 1 Ollie Nall, 16-M-21, 5 miles north of Clay.

INDIANA

EVANSVILLE.—Joe Reznik 1 W. F. Feil, SW SW SW 28-4s-10w, Vanderburgh County, wildcat 6 miles north of Vanderburgh pool and 12 miles north of Evansville, pumped 200 bbl. per day from lower O'Hara lime at 2,210-14 ft. George E. Engle has two and George & Wrather and H. L. Cokes one test under way in this same area.

Evansville pool remains active with three wells under way and locations spotted for two more. Calvert-Willis is operator for three active wells and Eason Oil Co. et al and Illinois Mid-Continent are operators for locations.

LA.-ARK.

Hunt's Wildcat to Plug Back To Test Previous Gas Shows

SHREVEPORT.—In Catahoula Parish, Hunt Oil Co. was planning to plug back at its 1 Louisiana Delta Lumber Co., in 6-4n-5e, and test gas shows found in drilling. Previous side-wall cores between 5,500-23 ft. showed gas, and gas and good oil odor between 5,580-98 ft. Total depth was 10,442 ft., in the Lower Cretaceous, with plugged-back depth at 5,670 ft.

Skelly Oil Co. pulled 5½-in. casing at its 1 Nash, 20-12n-16w, DeSoto Parish, and prepared to run a series of tests in the lower Pettit. The last reported perforations were at 6,100-20 ft. Tubing was run to 6,050 ft., the hole washed for 2 hours, after which it flowed a small amount of oil, then swabbed oil and wash water. It was acidized with 4,000 gal., then made an unestimated amount of oil, gas and acid water. Operators re-treated with 6,000 gal. and it flowed gas and distillate and was shut in for tanks. No estimate was made on the amount of flow.

In Bienville Parish, R. H. Crow 1 Fred F. Sutton, 18-17n-6w, was drilling below 5,417 ft. after running electric log. C. H. Murphy 1 George Pipes, 19-17n-5w, was below 5,650 ft. It topped the Massive anhydrite at 5,365 ft., by samples. Lyons & Prentiss 1 Muslow, 12-19n-15w, Caddo Parish, was drilling below 3,949 ft. in anhydrite. In Claiborne Parish, Carter Oil Co. 1 Gandy, 28-19n-7w, was drilling below 9,422 ft. in Travis Peak, with no additional information available. Union Producing Co. 1-A J. A. O'Brien, 5-19n-11e, East Carroll Parish, was drilling at 6,080 ft. in igneous rock and lime. In Natchitoches Parish, The California Co. 2 Breece Lumber Co. was drilling at 8,660 ft.

In Union County, Arkansas, Mulberry Oil Co. was attempting to shut off salt water at its 1-A Randolph Smith, in 25-18s-15w. Salt water and some oil was bailed and swabbed from perforations at 2,010-2,185 ft., in the Nacatoch sand. Total depth is 2,200 ft.

In Grant County, Stratton Drilling Co. 1 J. Stupka, 15-5s-12w, reported 12 ft. of saturated sand between 2,861-2,880 ft. Operators ran electric log to total depth of 3,102 ft. and shut down for orders.

In Columbia County, The Chicago Corp. 1 Chaffin, 29-16s-20w, was drilling below 8,863 ft. in the Cotton Valley. Robert W. O'Mears et al 1 T. F. Moody, a new 7,400-ft. Smackover test 3 miles east of the Buckner field, in 12-16s-22w, was drilling ahead below 1,180 ft. early this week. G. H. Vaughn 1 McCall, 30-17s-18w, was drilling below 4,155 ft. after coring from 3,263-71 and 3,812-22 ft. Sample tops reported were: Tokio 2,723 ft., Lower Cretaceous 2,953 ft., Kilpatrick 2,968 ft., and the James limestone at 3,538 ft.

New locations totaled 17 in North Louisiana, and 10 in Arkansas. These were: Bienville Parish 1 wildcat, Caddo 2, Claiborne 1, Concordia 1, DeSoto 1 wildcat, Grant 1 wildcat, LaSalle 1, Lincoln 1, Sabine 2; in Union Parish, 5 in the Ora field and 1 wildcat location. In Arkansas, by counties, locations were: Columbia 3, including 1 wildcat; Lafayette 2, Nevada 1, and Ouachita 4.

In North Louisiana, oil well completions, by fields, were: Caddo 10, Converse 1, Ora 4, and Monroe gas 3. The Village and Wesson fields each accounted for 1 oil well completion in Arkansas.

NORTH LOUISIANA WILDCAT FAILURES

Caddo Parish: M. T. Halbouty 1 Newton Smith, SW SE SE 24-20n-15w, dry, TD 3,125 ft., gas show 2,776-84 ft.

Concordia Parish: H. L. Hunt 1 Fisher Lumber Co., NE SE 25-7n-8e, dry, TD 10,310 ft., Massive sand 10,190-10,215 ft., Lower Cretaceous 10,215 ft., elev. 65 ft.

Tensas Parish: W. W. Smith 1 J. B. Miller, NE NW SW 18-10n-10e, dry, TD 5,015 ft., Wilcox 3,225 ft., elev. 66 ft.

Union Parish: J. A. K. Jones et al 1 C. D. Holloway, 22-23n-1w, dry, TD 2,225 ft., Wilcox 1,138 ft., Midway 1,536 ft., Arkadelphia 1,983 ft., Nacatoch 2,150 ft., elev. 200 ft.

ARKANSAS WILDCAT FAILURES

Bradley County: Marine Oil Co. 1 Crawford, NE SE SW 17-12s-9w, dry, TD 4,504 ft., Midway 2,503 ft., Arkadelphia 2,943 ft., gas rock 3,090 ft., Nacatoch sand 3,152 ft., Eagleford 3,762 ft., elev. 193 ft. Previous completion.

Lafayette County: J. K. Wadley 1 H. D. Haberzan, SW SE 7-16s-24w, dry, TD 5,300 ft., Massive anhydrite 4,958-5,086 ft., elev. 278 ft.

CANADIAN FIELDS

Leduc Southern Extension Completed for 2,280 Bbl.

CHATHAM.—South of the Leduc field, East Leduc-South Brazeau 1, LSD 8, 9-50-26w4, cored into the D-3 zone at 5,403 ft. and drilled to 5,412 ft., when a drill-stem test was run. The test released a gas flow at the rate of 700,000 cu. ft. daily, with oil filling the pipe 15 minutes after the tester was opened. It was allowed to flow into the flare line a few minutes, when 7-in. casing was set at 5,404 ft. and plug drilled. After swabbing down to 1,600 ft., the well kicked off and in a 3-hour flush run produced 285 bbl. of oil, or at a rate of 2,280 bbl. per day. At the end of 3 hours it was restricted to 21/64-in. choke and later to ¼-in. choke. The southernmost producer, it extends the Leduc field ¼ mile south of the former outpost wells, Imperial 2 and 7. The well was financed by East Leduc Oils, Ltd., which will recover costs from first production and then share profits equally with South Brazeau Petroleums, Ltd., holders of the 80-acre lease. Rotary outfit has been moved ¾ mile east to LSD 7, 9-50-26w4, for No. 3.

Globe-Leduc West 1, LSD 6, 19-50-26w4, finished at 5,104 ft., has initial production of 64 bbl. daily through 5/32-in. choke. Globe-Leduc West 3, LSD 10, 34-50-26w4, bottomed at 5,290 ft., is testing Home Leduc 1, LSD 11, 21-50-26w4, at 5,288 ft., is cleaning out and attempting to regain circulation in D-3 zone. Imperial 17, LSD 16, 16-50-26w4, bottomed at 5,125 ft., got 41 bbl. by heads after preliminary acid treatment and is retesting after acidizing with 2,000 gal. Imperial 20, LSD 8, 34-50-26w4, is in Devonian limestone and near completion. Two other tests are in limestone and five are in earlier stages of drilling. Imperial 28 has location in LSD 6, 21-50-26w4.

Restrictions lifted.—The Alberta Conservation Board, on November 29, rescinded until December 10 a quota order affecting Leduc producers, under which quotas were placed at 100 bbl. daily for D-2 zone and 150 bbl. daily for D-3 zone wells. A meeting was to be held on the date mentioned

(Continued on page 166)

LEGAL

15,138.59 acres of Tribal and Allotted Indian lands located in Townships 1 South, Range 1 East, 1 South, 2 Range East, 2 South, Range 1 East, in the Uintah and Ouray Reservation, Utah, are being advertised for lease, bids on which will be opened December 18, 1947, at 2:00 P.M., at the office of Forrest R. Stone, Superintendent Uintah and Ouray Agency, Fort Duchesne, Utah. Full descriptions may be obtained from Superintendent Stone, or from Supervisor J. R. Schwabrow, U. S. Geological Survey, Federal Building, Casper, Wyoming.

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Among the

Drilling Contractors

Kadane & Sons, Wichita Falls, are drilling British-American Oil Producing Co. 10 Green-D, Section 215, T&NO Survey, Seymour field, Baylor County, North Texas.

Penrod Drilling Co., Shreveport, is contractor for Placid Oil Co. 1 U.S.A., wildcat in C SE SE 30-5n-1w, Adams County, Mississippi, 1 mile north of Ireland.

Mercury Drilling Co., Tulsa, is planning 1 Loomis, SW SW NE 14-22-2w, wildcat northwest of Fourdee pool, Noble County, Oklahoma. Mercury will use its own rig to test Wilcox.

N. H. Wheless, Shreveport, is drilling Arkla Oil Co. 1 Glass, wildcat in J. C. Gahagan Survey, 6 miles southeast of Atlanta, Cass County, East Texas.

Waite Drilling Co., Tulsa, has staked location for a well at NW NE NE 28-20-10e, Osage County, Oklahoma.

M. C. A. Drilling Co. is drilling several shallow wells in Kern Bluff area, California, for Oceanic Oil Co. and Universal Consolidated Oil Co.

Arrow Drilling Co., Wichita Falls, and Cells Petroleum Co. are drilling 1 Fannie Allen, wildcat in D. M. Evans Survey, Longwood area, Harrison County, East Texas.

Gene Reid Drilling, Inc., Bakersfield, has contract for Huntington Beach field well for Quartette Oil Co.

Exploration Drilling Co., Tulsa, is planning to drill 1 Withers, wildcat in Section 66, Block 21, T&P Survey, 3 miles southeast of Sweetwater, Nolan County, West Texas. Contract is for 7,000 ft.

Nowery Drilling Co., Shreveport, has contract for Arkansas Louisiana Gas Co. 1 Nail Estate, C McCreary Survey, Carthage field, Panola County, East Texas.

Delta Drilling Co., Shreveport, will start 7,500-ft. test soon on lands it recently acquired from Tremond Lumber Co. in Winn Parish, North Louisiana. Acreage is in Sections 11, 12, 13, 14, 15 and 23-10n-1w, west of the town of Salt. Delta is also under contract for a deep test on a 14,000-acre block assembled in Jackson Parish by W. J. Anson et al. Leases are in Townships 15, 16, and 17n, Ranges 2, 3 and 4w, northeast of Jonesboro.

Helmerich & Payne, Inc., Tulsa, has contract for Phillips Petroleum Co. 1 Price, Jefferson County, Oklahoma, wildcat. Test will evaluate a 2,600-acre block assembled by George Oil.

Santa Maria Drilling Co., Long Beach, is drilling Union Oil Co. of California 11 Fleisher, Santa Maria field, California.

H. O. Grace, Wichita Falls, has contract for a 6,800-ft. test, the L. W. Barret 1 McCall-Fooshee, G. C. Cox Survey A-163, 2 miles east of Mallard field, Montague County, North Texas.

Rushing & Roberts have contract for a Richfield Oil Corp. wildcat, 50 Ojai, Ventura County, California.

Gabbert & Lindas Drilling Co., Inc., Wichita, is moving in for a rank wildcat, 1 Farrell, NE NE NE 18-22-20, Pawnee County, Kansas, 30 miles from nearest production in eastern Pawnee County.

Marhenke Drilling Co. holds contract for R. W. Holcomb et al 1 Carl, NW NE NW 23-29-3e, wildcat 2 miles west of Douglas pool, southwestern Butler County, Kansas.

California Commercial Drilling Co., Los Angeles, will drill General Oil Corp. 85-2, South Belridge field, California.

Warren-Bradshaw Drilling Co., Tulsa, has contract for Stanolind Oil & Gas Co. 1 Young, NW SE SE 25-13n-3w, west offset to discovery well of Witcher field, Oklahoma County, Oklahoma.

Keating Drilling Co., Tulsa, is contractor for Deep Rock Oil Corp. 1 Susie, SE SE NW 19-9n-11e, 1 mile southwest of Dustin pool, Hughes County, Oklahoma.

Arrow Drilling Co., Tulsa, has contract for The Texas Co. 1 Barnard

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et al, wildcat, Block 3, I. P. Rinehart Survey, 7 miles northeast of Tennessee Colony, Anderson County, East Texas. Contract is for 10,000 ft.

McCullough Drilling Co. has contract for two new Indiana wells. First is Ashland Oil & Refining Co. 49 Cooper Estate, 330 ft. from north and 1,650 ft. from west lines, NW 19-3s-13w, Gibson County, and second is same operator's 2 T. Rachels et al, 330 ft. from south and east lines, SE NW SW 36-3s-14w, Posey County.

Springer & Harper Drilling Co. has brought in a Lansing-Kansas City producer on northwest outskirts of Wichita, Kans. Well is Drillers Gas Co. 1 Rombach, CNL NW NE 11-27-1w, Sedgwick County. Test flowed 100-150 bbl. per day through 12 perforations from 2,715-20 ft.

Williams - Copeland Drilling Co., Tulsa, is starting a Hughes County, Oklahoma, wildcat for Deep Rock Oil Corp. Test is 1 McCorpin, SW SW NE 36-7n-8e, 3 miles south of Holdenville and on a 1,000-acre block.

Hewgley Drilling Co., Shreveport, is contractor for Cities Service Oil Co. 1 Jordan, C S½ SW NE 34-14n-2e, wildcat 7 miles south of Lexington, Holmes County, Mississippi. Contract is for 6,200 ft. Cities Service completed a 6,158-ft. failure a year ago in NW SW 35-14n-2e.

Earl Wakefield, Wichita, will drill Mid-Continent Petroleum Corp. 1 Mary Thompson, NW NW SW 5-35-3w, wildcat 3 miles west of Caldwell and 3 miles northwest of Caldwell pool, southern Sumner County, Kansas.

Sherin & Son, Oklahoma City, will drill Peppers Refining Co. 1 Eastland, NW SW NW 32-13n-2w, in newly discovered Witcher field, Oklahoma County, Oklahoma. Test is between Peppers 1 Hays and Gulf Oil Corp. 1 Miley.

Smith-Horton Drilling Co., Tulsa, is contractor on Mid-Continent Petroleum Corp. 1 Berry Estate, NW SW NW 32-9n-3w, McClain County, Oklahoma, wildcat which has found Bois d'Arc pay to mark a possible big extension to Oklahoma's Golden Trend.

Sterling Drilling Co., Sterling, Kans., has two tests under way on north side of Welch pool, southeastern Rice County, Kansas. They are 3 Miller, SW NE NW 3-21-6, and 4 Miller, NE SW NW 3-21-6. Sterling completed 1 Miller, SW SE NW 3-21-6, in September with 150-bbl. potential, and 2 Miller, NE SE NW 3-21-6, in October with 50-bbl. potential.

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STATISTICS and

WEEKLY WELL COMPLETIONS . . . WEEK ENDED DECEMBER 6, 1947

	Total of all wells					Cum.		Wildcat completions and discoveries					Cumulative total, 1947				
	Comp.	Oil	Gas	Dry	Footage	1947	1946	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	46	23	0	*23	50,197	1,629	1,479	0	0	0	0	0	3	0	0	2	5
Pennsylvania	73	34	4	†35	121,460	2,925	3,715	0	0	0	1	1	0	0	7	4	11
West Virginia	28	5	18	5	74,847	824	704	0	0	3	3	6	5	0	36	29	70
Ohio	33	14	13	‡6	89,267	1,279	1,193	0	0	1	0	1	0	0	8	42	50
Indiana	18	7	0	11	38,799	616	352	0	0	0	0	0	22	0	0	36	58
Kentucky	8	2	1	5	9,901	689	447	0	0	0	0	0	8	0	0	33	41
Illinois	48	20	3	25	119,912	1,957	2,153	0	0	0	12	12	60	0	1	335	396
Michigan	12	4	4	4	25,901	853	756	0	0	0	3	3	11	0	12	227	250
Kansas	41	18	4	‡19	137,123	2,514	1,888	0	0	0	6	6	40	0	13	326	379
Neb., Mo., Iowa	0	0	0	0	0	5	19	0	0	0	0	0	0	0	0	5	5
Oklahoma	70	33	4	33	232,499	3,768	2,821	2	1	0	18	21	107	9	20	647	783
Texas	189	116	10	63	914,697	8,608	7,337	6	1	1	42	50	281	54	76	1,355	1,766
North Central (Dist. 7-B & 9)	43	20	0	23	138,579	2,685	2,560	1	0	0	12	13	80	1	11	449	541
West (Dist. 7-C & 8)	43	35	0	8	219,168	2,108	1,661	3	0	0	2	5	47	0	3	156	206
Panhandle (Dist. 10)	18	14	3	1	65,908	445	288	0	0	0	1	1	1	0	2	11	14
Eastern (Dist. 5 & 6)	16	6	4	6	87,441	536	654	0	0	0	5	5	10	2	5	118	135
Gulf Coast (Dist. 3)	33	23	2	8	216,630	1,465	1,620	1	1	1	7	10	64	38	33	271	406
Southwest (Dist. 1, 2 & 4)	36	18	1	17	186,971	1,369	554	1	0	0	15	16	79	13	22	350	464
Louisiana	36	23	3	10	153,642	1,506	1,314	2	0	0	6	8	39	24	9	200	272
Northern	24	15	3	6	56,417	892	749	0	0	0	4	4	3	3	3	122	131
Southern	12	8	0	4	97,225	614	565	2	0	0	2	4	36	21	6	78	141
Arkansas	3	2	0	1	14,130	306	169	0	0	0	1	1	2	1	0	57	60
Mississippi	13	6	5	2	102,076	454	238	0	0	0	2	2	2	0	1	86	89
Southeastern States	0	0	0	0	0	59	42	0	0	0	0	0	0	0	0	50	50
Montana	5	1	3	1	8,476	285	298	0	0	0	0	0	6	0	8	25	39
Wyoming	6	4	0	2	22,144	240	158	0	0	0	2	2	13	0	6	43	62
Colorado-Utah	9	7	0	2	58,494	198	160	0	0	0	2	2	2	0	3	45	50
New Mexico	12	11	0	1	70,958	497	375	0	0	0	0	0	6	0	1	38	45
California	44	34	0	10	179,329	1,882	1,390	0	0	0	8	8	44	0	8	265	317
Total United States	694	364	72	258	2,423,852	31,094	27,008	10	2	5	106	123	651	88	209	3,850	4,798
Total previous week	664	358	59	247	2,337,503	30,400	26,483	9	0	2	89	100	641	86	204	3,744	4,675
Total December 7, 1946	525	278	63	184	1,704,013			9	1	5	69	84	522	41	120	3,269	3,952

Service wells included: *23, †34, ‡1.

CRUDE PRICES AND REFINERY ACTIVITY

GRAVITY SCHEDULES

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.*	Oklahoma, Kansas	Gulf Coast Tex.†	West Tex.‡
18-18.9	$1.67	....	....	....
19-19.9	1.69	....	....	....
20-20.9	1.71	$2.25	....	$2.12
21-21.9	1.73	2.27	....	2.14
22-22.9	1.77	2.29	....	2.16
23-23.9	1.80	2.31	....	2.18
24-24.9	1.84	2.33	$2.56	2.20
25-25.9	1.88	2.35	2.58	2.22
26-26.9	1.91	2.37	2.60	2.24
27-27.9	1.95	2.39	2.62	2.26
28-28.9	1.99	2.41	2.64	2.28
29-29.9	2.02	2.43	2.66	2.30
30-30.9	2.06	2.45	2.68	2.32
31-31.9	2.09	2.47	2.70	2.34
32-32.9	2.12	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*Standard Oil Co. of California. Does not reflect recent advance made by Union Oil Co. of California. †For crude from Daboval, El Campo, and Sandy Point. ‡Includes Lea County, New Mexico.

A.P.I. REFINERY REPORT, WEEK ENDED NOVEMBER 29

(Thousands of barrels)

District—	Crude runs, daily avg.	Production: Gasoline†	Kerosine	Gas & dist. oil	Residual	Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline*	Kerosine	Gas & dist. oil	Residual
East Coast	819	2,155	330	1,200	1,476	18,965	8,107	17,718	8,803
Appalachian:									
District 1	97	288	64	58	77	2,069	398	767	429
District 2	71	244	24	70	116	927	124	261	226
Ind., Ill., Ky.	887	3,134	374	1,019	1,106	15,379	2,939	9,056	5,484
Okla., Kans., Mo.	469	1,567	188	498	491	7,813	1,105	3,719	1,699
Inland Texas	248	1,004	141	123	410	2,914	718	546	740
Texas Gulf Coast	1,242	4,029	631	1,749	1,732	14,587	3,529	10,837	8,081
La. Gulf Coast	429	1,213	364	507	517	4,723	2,186	2,907	2,983
N. La., Ark.	61	160	46	39	87	1,536	340	414	225
Rocky Mountains:									
New Mexico	12	42	3	11	24	90	25	25	33
Oother Rocky Mt.	139	431	31	135	275	1,638	141	907	694
California	835	2,400	128	973	2,094	15,678	1,007	14,831	27,360
Nov. 29, 1947	5,309	16,667	2,324	6,382	8,405	86,319	20,619	61,988	56,747
Nov. 22, 1947	5,229	16,138	2,192	6,574	8,447	84,777	21,218	62,646	56,774
Nov. 30, 1946	4,699	15,289	1,888	5,354	7,693	86,619	20,666	68,464	58,371

*Finished and unfinished. †At refineries, including natural blended.

Bureau of Mines crude-oil stocks 224,540,000 bbl. as of November 29—up 535,000 bbl. One year ago 227,693,000 bbl.

FLAT CRUDE PRICES

Representative posted schedules per bbl.

East Texas	$2.65
Kettleman Hills, California*	2.14
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	1.8
Bradford, Pennsylvania	5.0
Eastern Ill. and Western Ind.†	2.7
Tomball, Texas Gulf Coast	2.8

*37°-37.9°. †35° and above.

TRENDS

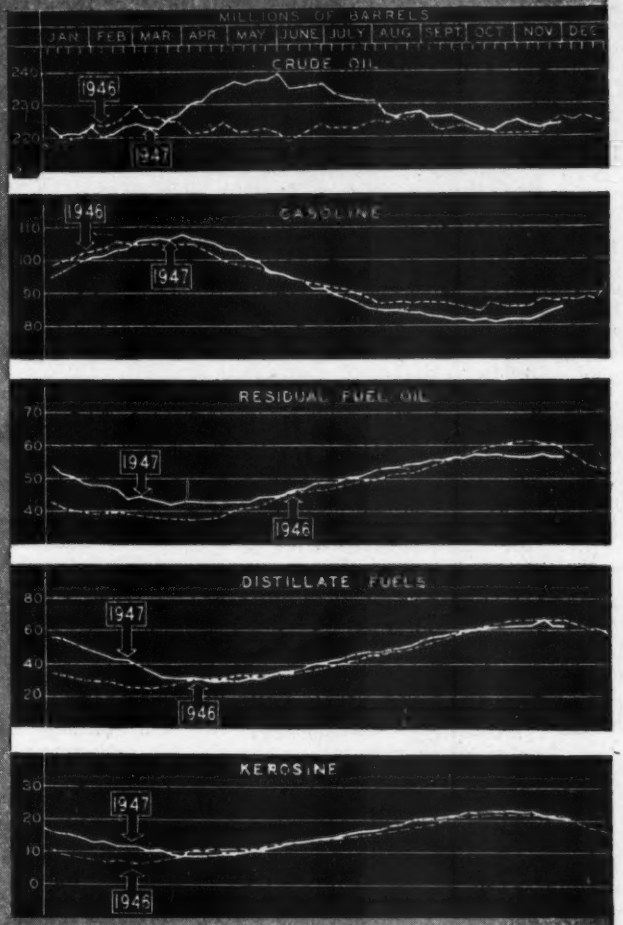
DAILY AVERAGE PRODUCTION FOR WEEK

	Dec. 6 crude oil	B. of M. Dec. demand	Nov. 29 crude oil
Alabama	1,250	1,500	1,200
Arkansas	85,150	82,000	84,900
California	932,100	930,000	923,700
Colorado	47,750	47,000	48,110
Eastern	60,800	64,600	63,450
Florida	825	1,000	750
Illinois	177,600	195,000	178,300
Indiana	18,800	17,300	18,400
Kansas	285,200	306,000	291,350
Kentucky	28,100	26,000	27,300
Louisiana	465,925	446,000	461,360
North Louisiana	120,900	.....	120,110
South Louisiana	345,025	.....	341,250
Michigan	43,965	45,000	44,870
Mississippi	109,010	100,000	109,565
Montana	23,070	24,000	24,760
Nebraska	500	600	550
New Mexico	119,950	120,000	117,175
Oklahoma	410,900	405,000	408,300
Texas	2,348,600	2,300,000	2,370,925
Dist. 1 (Southwest)	24,850	.....	24,425
Dist. 2 (Southwest)	163,825	.....	162,150
Dist. 4 (Southwest)	258,000	.....	259,475
Dist. 3 (Gulf Coast)	488,000	.....	491,575
Dist. 5 (Eastern)	42,275	.....	41,125
Dist. 6 (Eastern)	119,575	.....	118,175
East Texas Field	294,000	.....	318,575
Dist. 7-C (West)	41,385	.....	40,750
Dist. 8 (West)	648,750	.....	645,825
Dist. 7-B (W. Central)	42,100	.....	43,600
Dist. 9 (N. Central)	136,625	.....	136,075
Dist. 10 (Panhandle)	89,215	.....	89,175
Wyoming	126,110	125,000	128,270
Total United States	*5,285,605	5,236,000	5,303,235
Change from prev. wk., dn.	17,630		

Total production January 1-December 6. †1,723,947,800 bbl.
Same period last year (crude plus cond.) 1,616,324,750 bbl.

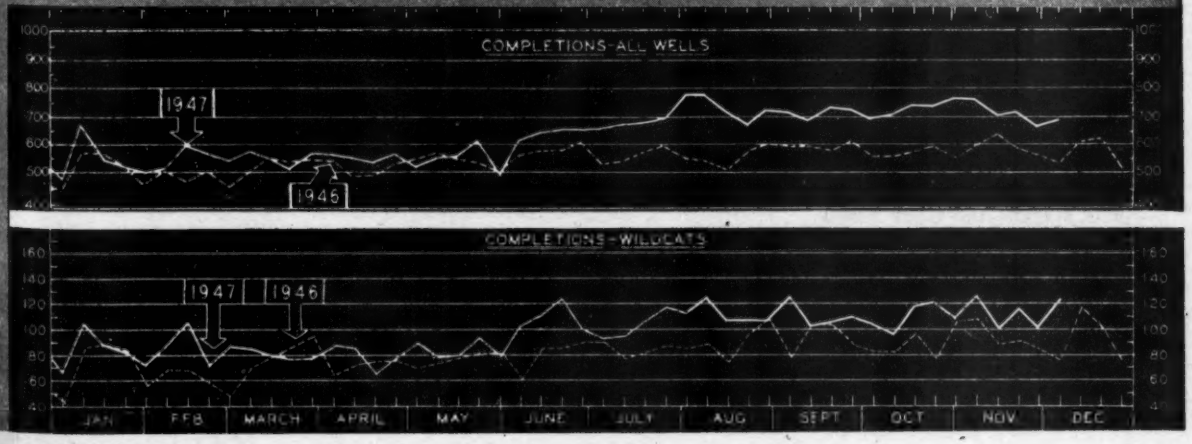
*Not incl. 47,020 bbl. condensate. †Incl. 11,570,890 bbl. condensate.

OIL STOCKS IN THE UNITED STATES



DAILY OPERATIONS

Solid line charts weekly completions, service wells in Eastern area included.



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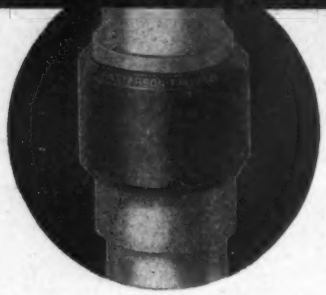

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MARKETS

PRODUCTS prices increased early this week following the action of of most leading companies to meet the recent crude price increase of 50 cents per barrel initiated by Sun Oil Co. November 28. Natural gasoline underwent two price changes in the past week, bringing grade 26-70, Group 3, to 8½ cents with North Texas at 8 cents.

Preceding the advance in products prices there was a general and perceptible slowing up in the movements of nearly all products in most areas.

Standard Oil Co. (Ohio) announced increases in its refined products prices with gasoline and distillate oils being raised 1½ cents per gallon while residual products were increased by 1¼ cents per gallon.

Margins Too Close

Mid-Continent refiners generally were agreed that all products prices would be advanced proportionately to the crude increase, pointing out that refining margins are too close to make it possible to absorb the crude increase.

At Houston one refiner was raising tank-wagon prices of all products except heavy fuel oil by 1¾ cents a gallon. Another supplier was reported planning a 1½-cent increase on middle distillates and was undecided as to the extent to increase gasoline prices. Early this week marketing officials of Gulf Coast area were generally awaiting action by major companies as to whether they will attempt to absorb any part of the crude advance. Contract material was reported to be moving at old prices.

In metropolitan New York an increasing number of service stations were curtailing their open hours as a result of allocation policies practiced by most of the major suppliers.

Gasoline demand over the nation for the week ended November 29 showed a substantial increase while light fuel oil was down from the preceding week, thus reflecting the milder weather that was more or less general at this time. The nation's gasoline stocks increased the preceding week while light fuel oil stocks showed a decline. Middle West stocks of burning oil on November 29 showed the largest gain in many months despite the decline of the week before.

Third Gasoline Boost

Natural gasoline, grade 26-70, was increased November 20 bringing Group 3 postings to 7⅛ cents per gallon. Another price change followed December 3 raising the posting to 7½ cents, and 3 days later price change raised the posting to 8½ cents.

In the Mid-Continent area the situation was described by one shipper as not a matter of price but rather of obtaining the products and delivering the goods. At the latter part of last week some suppliers were reported to be holding on to what available supplies they had awaiting developments. At the early part of this week refiners were indicating price advances in their products ranging from 1¼ to 2 cents.

The Indiana Farm Bureau Cooperative Association, by allocation to each co-op 110 per cent of its 1946 gallonage, began rationing gasoline throughout Indiana December 1 to accumulate a reserve for next spring's plowing and planting season.

Representative Quotations

Representative spot-market quotations of leading suppliers as of December 8, 1947. Figures are f.o.b. plant for tank-car shipment in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.‡

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor	Texas Gulf Coast
Regular gasoline, 73-75 octane	9-10¼	10.5-10.9* 9.6-10†	9-11¼
Premium gasoline, 78-80 octane	10¼-11	10.2-12	9½-12
42-44 w.w. kerosine	8.9	8.1-8.9	7½-10
No. 2 straw fuel oil	7½-8½	7.2-8	7-9
No. 6 residual	$2-2.35	$2.22-2.52	$1.98-2.75

*Branded (74-76 octane); †Unbranded (74-76 octane). ‡Quotations do not reflect the general crude raise that became effective December 6.

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	8½	8	8¼
Grade 18-55	10.2	9.6	9.9

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	11-12¼
750 vis., No. 3-4 neutral	13-14½
2,000 No. 5-6 neutral	14½-16

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	29-31
200 vis. No. 3 neutral, 0-10 pp.	18-19

Western Pennsylvania

145-155 vis. 10 p.t. bright stock	47
180 vis. p.t. neutral	45

CRUDE-SCALE WAX

Mid-Continent

130-132 A.S.T.M. melting point	7½-8¼

Developments Point to One-World Conception

(Continued from page 63)

Coast, might well be a profitable venture, though the profits would be far from staggering. Assuming a purchase price of $1.25 per barrel for Aramco crude (and a slightly better price might be obtained), it now costs—using U. S. Maritime Commission's charter tankers—about $3.13 per barrel. This is figured on a per barrel basis of 8 cents for insurance, 10½ cents for import tariff, $1.70 for transportation, and the $1.25 f.o.b. Persian Gulf price.

Many "If" Factors

However, there are admitedly so many "if" factors in the transportation picture of Middle East crude oil that one cannot accept, for instance, the recent assertion by Sen. Owen Brewster (R., Maine), that the U. S. could be "flooded" with Middle East oil. Exactly what Sun Oil Co. paid for its first tanker of Aramco crude oil (115,000 bbl.) which came in at Marcus Hook last week, is not known, but it is likely that it cost less than $3.13 per barrel laid down in Philadelphia.

The Davies group probably will have two valuable factors in its favor in transporting Middle East crude oil. First, it is probable that Aramco will make a good price. Then, the group will have its own tankers and won't be paying charter rates. It is a certainty, whether the independents transport Middle East crude, crude from some other source, or products from any source, that their standing with the State Department will be strengthened.

Meanwhile, the American Independent Oil Co. has feelers out in Mexico and it would be no great surprise if this group effected some type of negotiation with Petroleos Mexicanos, but such a negotiation probably would differ from the J. Edward Jones deal in which the latter is to act as a drilling contractor. It is interesting to note that Antonio J. Bermudez, director of Petroleos Mexicanos (Pemex) and the U. S. Ambassador to Mexico, Walter Thurston, agree that the first move, for outside interests, will have to be confined to drilling the 200 Pemex locations set by E. DeGolyer, internationally known geologist who worked on a consultant basis for Pemex. Jones has signed up to drill 101, leaving 99.

Will Talk of Return

After these have been drilled, and, of course, assuming that no significant discovery well is brought in (a rather poor assumption it might seem) then Pemex will be willing to talk about the possibility of United States and other outside oil interests returning to Mexico on a concession basis. However, even if some significant discovery is made meanwhile, there appears to be more than an even chance that outside interests will return to Mexico. *(The Oil and Gas Journal, November 29, page 46).*

In sounding out independent and major company opinion this week to the recently negotiated cuts in import duties on petroleum products, it was the concensus that this action will have no affect on the present supply situation in the United States. In ordinary times, assuming the availability of petroleum products outside the United States, the tariff cuts might be significant.

Commenting on this situation, Russell B. Brown, general counsel of the Independent Petroleum Association of America, states: "With the same mendacity that has characterized all the proceedings on oil, the Department (of State) sought in its analysis of the new tariffs to establish the impression that gasoline imports into the United States were of small consequence. They said that taxable imports of this product in 1939 were only $12,000 and in 1946 were $23,000. That was due solely to the duty, in my opinion, not to lack of desire of foreign operators to sell in the markets of the United States."

Seek Import Tax Reduction

Meanwhile, at least one faction of the independents, more or less headed by Gordon Duke, board chairman of Southeastern Oil and Affiliates, is urging the U. S. State Department to use its influence in seeking a reduction in the import tax on crude oil, which is now 10.5 cents per barrel, having been cut 50 per cent from the original 21 cents per barrel.

The legendary "major vs. independent" situation appears to be in for a change in that their interests, in some cases, are not nearly as sharply divided as formerly, particularly in so far as the foreign oil situation is concerned. And when substantial amounts of Middle East crude start coming into the United States (the schedule is now tentatively set for April of next year) it appears that independents as well as majors will be the importers.

April has been set as the month when more Middle East crude oil will be available largely because it is expected the crude oil pipe line from Saudi Arabia's Abqaiq field to Ras Tanura will be completed then. It is reasoned that the crude will be transported to the United States because of an estimated idle refinery capacity on the East Coast of 150,000 bbl. daily and because there is no idle refining capacity to take care of the additional crude oil in the Eastern Hemisphere.

East Coast refineries can handle approximately 300,000 bbl. daily of sour crude such as is indigenous to the Middle East and West Texas.

Free Enterprise Solution To Industry's Problems

(Continued from page 61)

not been done entirely and the Compact Commission must be eternally vigilant.

Another featured speaker was Merle Thorpe, director of business development of Cities Service Co., who urged better cooperation and understanding between the businessman and the politician, saying that each must operate by his own and very different methods but each should stay in his own field, and he pointed out that business enterprise, not politics, has created all the wealth and progress of this nation.

The Marshall plan for European recovery, which calls for exports of 2.7 billion dollars worth of petroleum and petroleum equipment out of a total of 20 billion dollars, was discussed by Dr. Waldo Stephens of Stephens Petroleum Co., Oklahoma City. The plan, he said, is not charity but it is a new foreign policy which means to the United States in the twentieth century what the Monroe Doctrine meant to the nineteenth, since American economy cannot maintain a high level without a friendly and prosperous Western Europe. The United States faces encirclement by a power sworn to destroy our institutions and free enterprise, he said, and the Marshall plan must be supported even though it means the exports of steel will drive many small oil companies out of business.

A special paper was presented on wild wells, fires and blowouts by Jack Kinley of M. M. Kinley Co., and C. P. Parsons of Sparton Tool & Service Co., which pointed out that in spite of the injury to conservation and property no state has made any effort to cope with these problems. The paper described the recent organization of the non-profit Well Protection Co., Inc., for the purpose of preventing and controlling wild wells, and suggested that state governments should support the project.

The Commission's legal committee reported that the subject of well fires is of sufficient importance to consider drafting suggested regulations for submission to the regulatory practices committee.

Legal concepts of unitization were discussed informally by R. M. Williams of Phillips Petroleum Co., Paul Montgomery, consulting geologist of Lafayette, La., and Robert E. Hardwicke, attorney of Fort Worth, Tex. They agreed that the legislatures and the courts are coming to recognize the legality, fairness, and necessity of unit development of an oil pool and that the ancient "rule of capture" is becoming a dead letter. It was predicted that within 5 years unitization will be the accepted method of field

development, as common as well spacing is today.

Following this the legal committee brought in a report declaring it "the concensus of opinion that any model law at this time should provide for compulsory unitization of oil pools," and recommending changes to accomplish this in the Commission's draft of suggested state conservation laws. The committee also asked that its membership be enlarged and that it be authorized to redraft the entire suggested model law to simplify it and keep it abreast of changing conditions and the latest scientific knowledge.

The regulatory practices committee reported it has arranged for eminent authorities to prepare a series of papers on gas-oil ratios for the next Commission meeting, and in the meantime it submitted a historical summary of the advancement of gas-oil ratio control in member states.

The research and coordinating committee submitted a list of unitization and cooperative development projects now in operation and reported progress in its comprehensive survey of this subject.

The stripper well committee reported that it is working jointly with the Commission's secondary recovery committee, the National Stripper Well Association, and the Independent Petroleum Association of America in its project to complete a modern survey of the stripper well petroleum reserves of the nation, and that the I.P.A.A. has contributed $10,000 to this project.

The advisory committee on secondary recovery recommended that the Commission ask all states to review their statutes and make all changes necessary to promote pooling or unitization for secondary recovery projects. It reported progress in its task of compiling information on secondary recovery practices and the estimation of secondary reserves, and announced that it is completing negotiations to employ a competent engineer to head this work.

Before adjourning, the Commission adopted a resolution of thanks and appreciation to its retiring chairman, Hiram M. Dow, and also thanked the governors of Illinois, Kansas, Oklahoma and Texas for their support of legislation to offset the tidelands decision.

Sale of Rubber Plants to Private Industry Favored in Hearing

WASHINGTON.—A free and untrammeled industry is the best guarantee of an adequate supply of synthetic rubber in the event of an emergency, in the view of the oil industry, it was developed last week at hearings before a House armed services committee on the long-range rubber program.

"In no other way," H. W. Fisher, general manager of the chemical products department of Standard Oil Co. (N. J.), told the subcommittee, "can the amount of research and aggressive effort necessary for the most effective development of this product be achieved."

The committee this week is exploring the Government's experience in rubber production and hearing the recommendations of officials as to future policy.

Undersecretary of Commerce William C. Foster recommended continuance of present controls on the use of natural rubber and the lease or sale of the plants to private industry, but with the Government continuing operations of such facilities as, with plants disposed of, are required to meet demand for synthetic. Further, he said, there should be an annual capacity, in operation and standby, of 600,000 long tons of general purpose and 80,000 tons of butyl. Research and development now directed by the Office of Rubber Reserve should be transferred to the Bureau of Standards, he contended.

Foster testified that Department of Commerce experts do not see any possibility of a supply of natural rubber adequate for all needs of American industry before the latter part of 1949, but believe as supplies increase it will be possible to reduce the present requirement for the use of synthetic in tires from a minimum of one-third to one-fourth.

Fisher, in the hearing last week, said two main considerations must be borne in mind: that this country never again should place itself in the position of relying upon an external source of supply to meet its essential rubber needs, and that we should not run the risk of falling behind in the development of synthetic.

These objectives, he contended, can best be attained by transfer of the government plants to private ownership, even though there is the possibility that economic and technical developments by industry could so change the nature of the plants that they would no longer be of maximum usefulness for synthetic rubber production in the event of an emergency.

Fisher laid down five points which he said should be embodied in the legislation:

1. The Government should acquire and maintain a natural rubber stock pile adequate to bridge the time gap between a possible loss of foreign supply and the full-scale reactivation of the synthetic plants.

2. All synthetic plants now owned by the Government should promptly be made available for acquisition by private industry.

3. All lease or sale contracts for any rubber facility should provide that if not operated for the production of synthetic rubber or rubber raw material, the operator should obligate himself for a long period to maintain it in such condition that it can be restored within a reasonable time.

4. All facilities not disposed of should be maintained by the Government in such condition as to permit prompt reactivation.

5. The Government should entirely discontinue manufacture within a reasonable time.

Officials of Firestone Tire & Rubber Co., General Tire & Rubber Co. and B. F. Goodrich Co. expressed approval of the granting of authority to the National Security Resources Board to dispose of the plants during the coming year, while United States Rubber Co. and Goodyear Tire & Rubber Co. urged retention of the facilities for at least 15 months more.

All of the "Big Five" rubber companies, however, favored continuation of the present requirements for the use of synthetic rubber.

Military Needs Being Met, Opposes Aid to Civilians

WASHINGTON.—Military oil requirements for the last half of this year have been 91.6 per cent filled, and the armed forces are short now only by 4,829,000 bbl., of which 3,281,000 are Navy special fuel oil, it was reported this week by the FPC Committee on Military and Government Petroleum Requirements.

During November, the committee said, industry offers increased by 1,982,000 bbl. net, 790,000 of which was Navy diesel oil.

Assistant Secretary of the Navy John Nicholas Brown disclosed this week that the Government will not be able to release any of its military supplies to alleviate shortages of civilian stocks.

Brown denied a request by Senators Green and McGrath of Rhode Island to release fuel oil from its Narragansett stocks to meet an emergency in New England, pointing out that it already has been necessary for the Navy to dip into its fuel storage to a point "which has reduced strategic resources below a safe level."

Any further reduction of stocks, he said, would be inimicable to the condition of readiness and mobility of the fleet.

Aluminum Tubular Goods Soon to Be Offered by Two Manufacturers

A DRIVE to sell aluminum tubular goods to the oil and gas industry during the present period of acute steel shortages is about to be launched by the two leading aluminum manufacturers, Aluminum Corp. of America and Reynolds Metals Co.

Both companies have been experimenting, quietly and competitively, with aluminum tubular goods in various oil field uses, and Reynolds, at least, is now ready to market its pipe for surface lines in sizes from 2 in. to 6 in. and well casing for surface strings up to 12 in. in diameter.

The line pipe is made in standard diameters, with standard wall thicknesses and thread and coupling fittings. It may also be used with flexible-type couplings, and a new welding process permits welding under field conditions without the use of flux. Since aluminum pipe is made from billets by the extrusion process, the length of joints varies with the diameter and wall thickness, but 2-in. line pipe is available in lengths up to 60 ft.

List prices for aluminum pipe will be "only slightly higher" than those for comparable steel pipe, the companies say, but there will be no "extras" as is often the case with steel pipe at present, there will be big savings in freight and handling costs because of the lighter weight, and the salvage value may be higher. The chief selling point will be its availability, as the manufacturers estimate they can produce next year the equivalent of 100,000 to 200,000 tons of steel pipe. Arrangements are now being made to distribute aluminum pipe through established oil well supply dealers.

Technical specifications and tables on line pipe pressure limits are being prepared, but one company plans to recommend its 4-in. pipe for 1,600 psi. working pressure since tests indicate a bursting point above 2,400 psi.

Because of aluminum's corrosiveness under certain conditions, the manufacturers advise close consultation with their engineers before an installation is planned. In general, aluminum pipe is satisfactory for gas, air, fresh water, or oil with a low salt content. Salt water and alkaline solutions corrode aluminum rapidly, but the metal is said to be more resistant than steel to acid waters, sulfur, and hydrogen sulfide. At times the salt and sulfur content of crude may neutralize each other, and for that reason the companies offer to analyze a sample of the material to be put through the line before aluminum pipe is specified.

Where aluminum pipe is to be buried the manufactures advise a soil analysis, and recommend that such lines be wrapped or coated. For pipe-line networks involving a range of pressures at different points it is claimed that the availability of aluminum pipe in varying wall thicknesses offers possibilities of substantial cost savings by using thin-walled pipe in low-pressure sections.

Both companies are hesitant to make sweeping claims for aluminum pipe for general oil-industry use or to discuss tests still in progress. It is known, however, that one of them has been testing a string of surface casing in a well in Jacksboro field, Jack County, Texas, and a 4,400-ft. string of production pipe in a well at McCamey, Tex. Experiments are also being made with the production of aluminum drill pipe, which would offer substantial advantages in weight savings.

Oil Export Figures Given House Group

WASHINGTON.—Exports of crude and refined petroleum during the first 9 months of 1947 aggregated 96,971,000 bbl., it was reported to the House interstate commerce committee last week by the Office of International Trade. With 18,831,000 gal. of blending agents or antiknock compounds the 9-month exports had a value of $482,993,000.

Details of the oil-export trade were given the committee in response to a resolution by Rep. Edith Nourse Rogers of Massachusetts calling for information on shipments to Canada.

The OIT report showed that Canada received 28,713,000 bbl. of crude oil, 1,083,000 bbl. of natural gasoline, 5,003,000 gal. of blending agents, 472,000 bbl. of aviation motor fuel, 2,436,000 bbl. other motor fuel, 4,619,000 bbl. gas oil and distillate, and 143,000 bbl. red and pale lubricating oil, with a total value of $110,593,000.

Lambing Season Halts West Texas Oil Work

Dynamiting in oil exploration will be banned on some University of Texas lands from December 15 to May 1 because of the lambing season.

Permits for geophysical exploration will be issued at $150 per crew for each 15-day period except in those West Texas counties where the lands will remain closed.

Counties on which there will be no seismograph activity are Crockett, Irion, Schleicher, Reagan, Upton and Pecos.

Illinois River Waterway To Be Kept Free of Ice

WASHINGTON.—Acting on the recommendations of an NPC committee, Secretary of the Interior Krug last week announced that, with the cooperation of the Inland Waterways Corp. and the Army Corps of Engineers, the channels and locks of the Illinois River waterway will be kept sufficiently free of ice this winter to permit maximum barge traffic.

Cost of the operation is estimated at about $250,000, which will be borne by the Army Corps of Engineers, but the actual operations will be carried out by the Inland Waterways Corp., which will work at least four ice-breaking towboats along with several ice plows of the Coast Guard.

The Illinois River waterway never before has been kept open uninterruptedly throughout the winter, but the NPC committee, headed by B. L. Majewski, vice president of Deep Rock Oil Corp., declared last month that the impending danger of aggravated fuel shortages in the Illinois-Michigan area justified a determined effort to keep traffic moving this year.

Interior officials estimated that some 407,000 tons of petroleum a month will move over the waterway this winter. About 75 per cent of the petroleum will be fuel-oil going to consumers in the greater Chicago area.

The ice-breaking operations also are expected to release a considerable number of railroad cars for use in other parts of the Middle West.

Transferred Tankers Being Put Into Service by Navy

WASHINGTON.—Two of the 50 tankers to be transferred to the Navy by the Maritime Commission already are in service, 16 will be operating by the end of the month, and all 50 will be working by mid-February, the House armed services committee has been informed by Undersecretary of the Navy W. John Kenney.

Kenney reported that the Navy has a total of 36 tankers in operation. Twelve of these are assigned to the Pacific Fleet, 8 to the Atlantic Fleet and the remaining 16 are hauling oil from the Middle East and elsewhere to military installations for all three of the armed services. The tankers assigned to the fleets also are released temporarily when they can be spared for this service.

EQUIPMENT MEN ... in the News

Bannan Awarded Navy Citation

B. A. BANNAN

Berchman A. Bannan, Southern California industrialist, has been awarded a special citation by the Bureau of Ships, U. S. Navy, for his wartime services as vice president of Western Gear Works, Lynwood plant. The special citation was made by Vice Adm. E. W. Mills, chief of the Bureau of Ships, who commended Bannan for "inestimable help in expediting the production of gears to relieve a shortage of this vitally needed equipment."

Bannan is vice president of Western Gear Works, Pacific Gear & Tool Works, San Francisco, and manager of Southern California Division of Western Gear Works.

Mack Appoints Fikejs

Harold J. Fikejs has been appointed manager of Mack Truck Co.'s Milwaukee direct factory branch. Fikejs, who at 31 is one of the youngest men in the company's history to hold a branch managership, has served Mack as truck salesman and district wholesale manager at the Des Moines branch since he joined the company in 1946, following a 4-year tour of duty with the Army.

Leeds & Northrup Buys Additional Building

A two-story-and-basement building at 34 E. Logan Street has been purchased by Leeds & Northrup Co., manufacturers of electrical measuring instruments, automatic controls, and heat-treating furnaces. The newly acquired property will add approximately 11,000 sq. ft. of floor space to the 288,886 sq. ft. now in use at the Leeds & Northrup plant on Stenton Avenue. The purchase price was not revealed.

Gruitch Heads Research

Announcement has been made by American Car & Foundry Co., New York, that Jerry M. Gruitch has been appointed director of research and development. Gruitch has had a long career in the field of engineering and research. He holds the degree of B.S.M.E. from University of Michigan and M.M.E. from Chrysler Institute of Engineering. He is also a registered professional engineer and a member of Tau Beta Pi, Society of Automotive Engineers, American Society of Refrigerating Engineers, and the American Society of Heating and Ventilating Engineers.

Dia-Log Merges With Ford Alexander

Ford Alexander Corp., which has been actively engaged in the well-shooting and explosives business in California since 1911, has announced its merger with Dia-Log Tubular Survey Co. Dia-Log, which has operated its tubing and casing survey service in the Mid-Continent area since 1943, will now operate as a division of Ford Alexander Corp. In addition to its present services Dia-Log will now make available in the states outside of California the drill pipe backoff and liner-cleaning services developed by Ford Alexander.

FORD ALEXANDER

JIM KLINE

There will be no changes in the corporation's present personnel. Ford Alexander, pioneer well shooter and explosives expert of 40 years' experience, will continue in his present capacity in charge of well shooting and explosives sales with offices in Whittier. Boyd Alexander, who has been with the corporation since 1930, will remain as manager of the San Joaquin Valley area with offices in Taft.

For the Dia-Log Co., Jack Kline will remain as manager of the Kansas division and Bill McNulty as manager of the Texas division.

Harry Whittaker, owner-manager of the Whittaker Well Shooting Co. since 1939 and active in the explosives business for the past 22 years, is now associated with the Ford Alexander organization in the explosives and well-shooting department. Also joining the Ford Alexander organization is Jim Kline, who for the past 8 years has been with the petroleum-engineering department of Richfield Oil Corp.

Skeehan Joins Thornhill-Craver

Jack Skeehan, formerly with Spang-Chalfant Co., Houston and Los Angeles, has joined Thornhill-Craver Co., Houston. Skeehan is the Unibolt field representative in the Pacific Coast area with headquarters in Los Angeles.

Ahlberg Joins Davison Chemical Corp.

J. Elston Ahlberg has joined the research staff of the Davison Chemical Corp., Baltimore. Dr. Ahlberg is well known in the oil industry for his work in the development of methods of manufacturing cracking catalysts. During the past 11 years he was associated with the Universal Oil Products Co., Chicago.

Davey Compressor Names Pratt

H. A. Pratt has been appointed parts and service manager of Davey Compressor Co., Kent, Ohio. A veteran of over 20 years of company service, Pratt was formerly superintendent of the Kent plant.

Gar Wood Names Export Vice President

In connection with the company's expanding sales program, announcement has been made by Gar Wood Industries, Inc., Wayne, Mich., of the appointment of Walter C. Robertson as vice president, export, handling all products of the three divisions of the company. Robertson has been with the company for 21 years, and for the past 11 years has been vice president in charge of national accounts. A native of Brooklyn, he has had his office in New York City, but in his new capacity his headquarters will be located in the executive offices at Wayne.

Air Preheater Adds Hammond

Air Preheater Corp., 60 East Forty-second Street, New York, has announced that W. B. Hammond, with the U. S. Maritime Commission since 1938, has joined the company's staff. He will be located at the Wellsville, N. Y., plant. From 1942 Hammond was chief of the engineering scientific and electrical branch, design division, of the Maritime Commission. Prior to joining the government agency he was with Gibbs & Cox, naval architects for 3 years.

B. V. Fisher Joins Delaney

Delaney Co., Houston, manufacturers of forged-steel well heads, christmas-tree fittings, and other oil-well-drilling and completion specialties, has announced the appointment of B. V. Fisher as sales manager of its oil-field division.

Fisher is widely known in the oil industry, having only recently vacated the position of executive vice president of Oil Center Tool Co., a firm which he has served in various executive positions for the past 11 years. Prior to that time he was connected with Continental Supply Co. and Westcott Valve Co.

Fisher is a member of the Houston chapter of Nomads and has long been active in the Association of Well Head Equipment Manufacturers, Petroleum Equipment Suppliers Association, and American Petroleum Institute.

Allis-Chalmers Completes 100 Years

Coinciding with the greatest period of United States industrial development, Allis-Chalmers Manufacturing Co., Milwaukee, this year completes a 100-year record of engineering and manufacturing a diversified line of major industrial products.

Started in 1847 by Charles Decker and James Seville, Allis-Chalmers represents an organization formed from 16 separate firms which today is supplying more than 1,600 different products to industries all over the world.

This producer of power generation, power distribution, and power-utilization equipment was conceived by Edward P. Allis, a native of Cazenovia, N. Y., who with two other men, acquired Decker & Seville in 1861. It was Allis who established the company policy of diverse manufacture—adding new products and services to meet the changing requirements of a wide range of industries.

Edward P. Allis & Co.'s early history is one of expansion and merger. From this early development, Allis-Chalmers has become one of the largest and most influential manufacturers in the power-machinery field.

Saran Lined Pipe Co. Formed

Saran Lined Pipe Co., a newly organized firm, will act as exclusive distributors for Dow Chemical Co.'s recently developed specialty pipe and fittings. The pipe and fittings, lined with Saran, a Dow plastic, was developed for use where highly corrosive materials are handled in manufacturing processes.

S. H. Blackmore, sales manager of Saran Lined Pipe Co. whose offices are located in the Stephenson Building, Detroit, said that his firm plans to establish sales representatives and jobber outlets to handle the product throughout the country.

Heinlein Appointed Assistant Superintendent

Announcement is made by Link-Belt Co. that Leonard C. Heinlein has been appointed to the newly created position of assistant superintendent at the company's Ball and Roller Bearing Division plant in Indianapolis. All production and its attending problems are included in the functional duties of this new office.

Works Managers Named For Ingersoll

Works managers have been appointed for the Chicago and Kalamazoo, Mich., plants of Ingersoll Steel Division, Borg-Warner Corp. The Chicago post goes to Joseph A. White, formerly general superintendent of Columbia Steel Co. at Pittsburg, Calif. The Kalamazoo post will be filled by Milo F. McCammon, who has been assistant works manager there for the last year.

Robert S. Ingersoll, who formerly served as works manager for both plants, now will be enabled to devote his full time to his duties as vice president of Ingersoll Steel Division in charge of manufacturing at the Chicago, Kalamazoo, and Evansville, Ind., plants.

Day Appointed Director Of Mack Research

W. E. Day has been appointed director of research for Mack Trucks, Inc. In assuming his new duties Day relinquishes the post of chief metallurgist for Mack, as well as that of general foundry superintendent.

Sutton Advanced By Bethlehem

Bethlehem Supply Co. announces the recent promotion of H. S. Sutton to manager of the Panhandle district with headquarters at Pampa, Tex.

Sutton has been employed by

(Continued on page 165)

Built to further its long-range plans for extended and intensified research in the application of air products to industrial and commercial developments, Air Reduction Co., New York, held open house recently to a large number of visitors to show the new research laboratory near Summit, N. J. This laboratory which started work only a few weeks ago includes a main building with some 78,000 sq. ft. of floor space, two smaller buildings, combination boiler house and garage, and an acetylene-generator house which supplies fuel for the work of the staff

Classified Advertising

The Market Place for the Oil Industry

UNDISPLAYED

All ads, 10 cents a word. Minimum charge, $3.00 per insertion.
Centered Line, any ad, 75 cents.
Box Numbers count 9 words when replies are to be sent to our Tulsa Office. Replies forwarded without charge.

DISPLAYED, PER INCH

$10.00 per column inch per insertion. One-point border and 12-point capitals are allowed. Larger type sizes not accepted.

All classified advertising payable in advance.
10% Discount if 3 insertions are ordered at one time.
COPY DEADLINE, 9:00 a.m. Monday prior to each week's issue.

THE OIL AND GAS JOURNAL
P. O. Box 1260, TULSA, OKLAHOMA

EQUIPMENT FOR SALE

FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

JENKINS UNIT—One vessel, 20 ft. x 6 ft. diameter, 1 inch thick. Two vessels, 12 ft. x 6 ft. diameter, 1⅛ inch thick. Omar Refining Co., Garber, Oklahoma.

OFFERING USED EQUIPMENT, fully reconditioned. Our prices save you money. Spudders, Wichita #61, Wichita #50, Ft. Worth Super H, Ft. Worth Super C, Ft. Worth N, Clipper 1000', Keystone #2, Keystone #5½. Beam machines, Leidecker #32, National 3B, Standard with steel derrick. Rotaries, Failing 314C, Special 750', American 350'. Core drills, Sullivan CN, Longyear. Engines, tools, cable, casing. Almost everything for well drilling. Pressey & Son, Pueblo, Colo.

EQUIPMENT FOR SALE

FOR SALE, or trade for spudder, practically new 4000' Franks rod and tubing machine, mounted on 5-ton General Motors tandem truck with power take off, complete with mast and new tools. J. A. Rives, Borger, Texas, Phone 1076W.

FOR SALE: Immediate Delivery Wilson Titian Rig Complete 3 V-12 Lerol Motors—C-350 Ideal Pump, 336 JTs—4" Drill Pipe—New Blowout Preventers—17 Drill Collars—Everything Needed for Deep Well Drilling—Inventory Sent by Request. FRENCH TOOL & SUPPLY COMPANY, Box 2752, Odessa, Texas.

FOR SALE

12—230 H.P. Type 10 Bessemer New 17" Power Cylinders complete ready to run with 16" to 18" Compressors. 1—230 H.P. Clark Horizontal with Compressors. Located Salem, Illinois.

ENGLE PETROLEUM, Incorporated
Box 655, Evansville, Indiana

NEW PIPE AND TUBING

758'—1.9" OD x 2.15# x 20' RL.
30,000'—1¼" OD x 1.03# x 18' RL.
1,800'—1⅜" OD x 1.3# x 9'-12'.
800'—1⅜" OD x 2.38# x 20'.
4,600'—1.587" OD x 5# x 10' RL.
30,000'—2.5" OD x 2.8# x 20'.
5,100' 2⅞" OD (2½) x 5.5# x 20'.
315'—2⅞" OD (2½) x 7.66# x
388'—3½" OD x 15.35# x 20'.
1,000'—4" OD x 7# x 18' RL.
392'—4½" OD x 10.35# x 8'-10'.
107'—4½" OD (4") x 14# x 8'-10'
643'—6¼" OD x 23.5# x 8'.
150'—12¾" OD x 43.77# x 5'-6'.

Horwitz Pipe & Steel Co.
415 S. Western Oklahoma City, Okla.

OFFERED FOR IMMEDIATE SALE

PROMPT DELIVERY

ALL REFINING EQUIPMENT AND MATERIAL

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Towers & Vessels—Condensers & Exchangers,

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EQUIPMENT FOR SALE

HEAVY duty kelly rig, hydraulic lift mast, 4½ x 6 G. D. pump, chain pull down, Twin Disc clutches. Drill and tank mounted on 1944 Ford trucks. Will sell or lease. Waters Drilling Service, 69 Beacon Place, Pasadena 8, Calif.

HOLLOW spindle 24" Lodge and Shippley lathe new—18" lathe—9" lathe. All other equipment for oil field work—Good growing town. Have other interest so must sell this business. Write to Box 317, Plainville, Kansas.

IMMEDIATE DELIVERY

Angle Iron

1 carload 58,680 lbs.
5" x 3½" x ⅜" 30-40' lengths

1 carload angle iron and plate 52,650 lbs.
7" x 4" x ⅜" 30-40' lengths. 23,200 lbs.
¾" x 65" x 168" plates SAE 1010.

Victory Supply Company

120 N. Elgin Tulsa, Okla.

NEW PUMPS FOR SALE

3—Figure # 1560, 5" x 10" Gaso Reciprocating Pumps, Powered with R4I Climax Engines.

Also Figure # 1860 Gaso 4½" x 6" pumps, Byron Jackson, Economy, Gorman-Rupp, Hale Fire Pumps, Aurora, Lombard and Model KH2 Novo Centrifugal Pumps, complete with engines.

Write for list and prices.

H. A. McCARTHY
310 Thompson Bldg.
Phone 5-3296 Tulsa, Okla.

FOR SALE

STEEL STORAGE TANK

5—74,000 Barrel, 115' x 40'
1—5,500 Barrel

Available at Once!

IRON & STEEL PRODUCTS, Inc.
42 years' experience
13412 S. Brainard Ave., Chicago 33, Ill.
"ANYTHING containing IRON or STEEL"

DRILLING EQUIPMENT FOR SALE

1—U-10 Unit Rig complete with Hydratarder, 136' Lee C. Moore Mast with substructure, blowout preventers. This rig now in operation Natchez, Mississippi.

1—U-10 Unit Rig complete with blowout preventers and all tools necessary for complete rig. This rig completely overhauled and now in our yard Delhi, Louisiana.

This equipment all in first-class condition and is being offered for sale due to our replacing same with larger equipment. Inventory and price on request.

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